WA 6906
7-15-83
17a

[redacted]

/RC/ -478A1

WA D00903 6906
Ridgefield Brick and Tile
478A - Permanent (8 of 9)

WA690600478A 08 0000
$00085055

RECEIVED
JUL 19 1983
TECHNICAL OPERATIONS SECTION

USEPA RCRA
3058030

Sweet, Edwards & Associates, Inc.

DRAFT

CLOSURE PLAN
FOR
RIDGEFIELD BRICK AND TILE SITE
RIDGEFIELD, WASHINGTON

JULY 15, 1983

SUBMITTED TO:

PACIFIC WOOD TREATING CORPORATION
110 WEST DIVISION STREET
RIDGEFIELD, WA 98642

SUBMITTED BY:

SWEET, EDWARDS & ASSOCIATES, INC.
P.O. BOX 328
KELSO, WA 98626

IN ASSOCIATION WITH

PATRICK H. WICKS, P.E.
2535 - 152ND AVENUE, N.E.
REDMOND, WA 98052

Subpart F GW Monitoring

265.90 → .93

Subpart G Closure & P-Closure

Closure

P-Closure

Subpart H

Financial assurance Post-Closure

264.146

Subpart N - landfills

265.310 Closure & P-Closure

4207G

File

UW 6900

7.15.83

89

PACIFIC WOOD TREATING CORPORATION

17a

July 15, 1983

RECEIVED
JUL 19 1983
TECHNICAL OPERATIONS SECTION

Mr. Thomas Eaton, P.E.,
District Supervisor
State of Washington
Department of Ecology
7272 Clean Water Lane, MS LU-11
Olympia, WA 98504

Dear Mr. Eaton:

In response to Notice of Penalty No. DE 83-284, enclosed are two copies of the draft closure plan and draft post-closure plan for your review and approval. Incorporated in these draft plans are the ground water monitoring program and relevant implementation schedules.

This would be more appropriate than developing the ground water monitoring program separate from the closure/post-closure program as suggested by Items 2a and 2b of the Notice of Penalty; Terms Section. Furthermore, combination of the programs will result in consistent schedules and compliance deadlines.

These plans should satisfy the requirements of Items 2a and 2b of the Terms Section of the Notice of Penalty up to the present time, pursuant to the adjusted deadlines.

You will note in the enclosed plans that three options for closing the RBT site are proposed. We expect that one of these options, or a slight modification thereof will be acceptable. As you are aware, the possibility of removal of the waste and immediately underlying soil from the site and disposal at a licensed hazardous waste facility has been considered. The cost of that action would approximate $1,000,000.00 and is untenable for this company as it could seriously affect the viability of our plant which we consider to be the cleanest wood treating operation in the Northwest. Furthermore, it would be unnecessary since one of the proposed options should resolve the situation at an estimated cost of $45,000 to $53,000.

(Cont'd. on page two)

111 WEST DIVISION STREET • P.O. BOX 518 • RIDGEFIELD, WASHINGTON 98642 • (206) 887-3562

Please contact Mr. Vince McQuiggin if there are any questions regarding the enclosed plans.

Cordially,

PACIFIC WOOD TREATING CORP.

By - Mark T. Moothart
General Manager

cle
Encls.

cc: Mr. George Hofer
U.S. Environmental Protection Agency
Region X
1200 Sixth Avenue, M/S 532
Seattle, WA 98101

Mr. Dave Myer
Geo-Sciences Research & Engineering Dept.
Battelle Laboratories
3110 Port Benton Blvd.
P.O. Box 999
Richland, WA 99352

Enforcement Officer
Department of Ecology
State of Washington
Olympia, WA 98504

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INTRODUCTION

This plan has been developed to be consistent with and meet the requirements of applicable portions of certain Federal regulations, specifically 40 CFR 265, subpart G (265.110 - 265.120) and 40 CFR 265.310, as directed by Washington Department of Ecology Notice of Penalty No. 83-284. This plan has also been developed and designed so that the environment will be protected within reasonable costs.

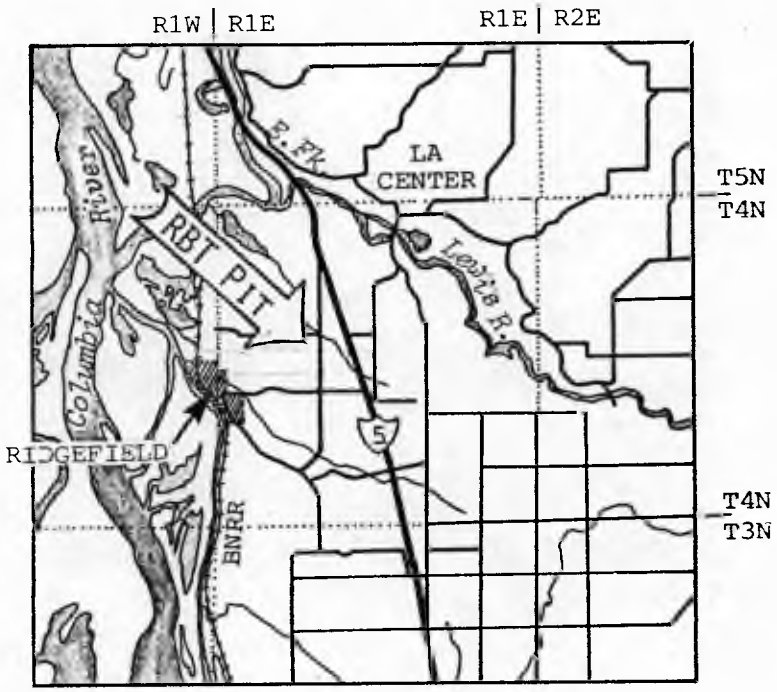
Until closure is completed, a copy of this plan will be kept at the Ridgefield Brick and Tile site (RBT), located near the corner of N.W. 289th Street and N.W. 31st Avenue, Ridgefield, Washington, see Figure 1. A copy of this plan will be kept for five years after closure is completed at the offices of Pacific Wood Treating Corporation, 111 West Division Street, Ridgefield, Washington.

The actions described herein will be conducted by Pacific Wood Treating Corporation or its contractors, unless otherwise noted.

PLAN DESCRIPTION

Three options for closure are proposed and described in this plan. Option I would cover the waste in its present location with a top seal to minimize potential infiltration into ground water. Option II would provide a keyed, compacted soil, cutoff wall around the waste in addition to a top seal. Option III would provide a top seal over the waste as well as a liner under the waste in a new location on the same property.

This option was used, with some variation.



N

Scale: 1"= approx. 20,000'

CLARK COUNTY

RBT PIT
Location Map

FIGURE 1

Sweet, Edwards & Associates, Inc.

Specific actions to be taken for closure of the site are described in this section. For purposes of clarity, this description is divided into five sub-sections as follows: A. Closure Procedure (Options I, II and III); B. Schedule (Option I, II and III); C. Closure Design (Option I, II and III); D. Compliance with 40 CFR 265.310 and; E. Certification.

A. Closure Procedure

The following steps would be undertaken during closure. Each step would start and end as indicated in the schedule, sub-section B. Each step would be conducted according to the closure design, sub-section C, if design parameters are applicable.

OPTION I

1. Soil testing: Test compacted permeability of on-site materials to be used for compacted soil seals over current disposal area to determine that 10^{-6} cm/sec can be achieved.

2. Dry existing pond: Existing pond on site must be dried to allow operations in that area for placement of compacted seal. This will be accomplished by sprinkling pond water on a small area west of the pond at a low rate and during dry weather so that it evaporates and does not run off. No water would be allowed to accumulate in the pond for 2 weeks before other closure activities commence.

3. Site preparation: Grade refuse surface to approximate contour of final cap. Prepare base of southeast refuse face for compacted soil barrier placement. Decontaminate equipment used in this step by washing exposed areas with a small amount of water while the equipment is on top of refuse; equipment to exit so as to not spread contamination.

4. Top seal: Move low permeability soil identified by step 1 to form top seal according to design, sub-section C. Install vent according to design, sub-section C.

5. Final grade: Disposal area, borrow areas, pond ditch and other new slopes to be final graded according to design, sub-section C.

6. Monitoring wells: To be installed as indicated in design, sub-section C.

7. Seeding: Top seal and other new slopes to be planted according to design, sub-section C.

8. Fence: To be installed (2 strands barbed wire, metal posts, one locked gate) at location shown in design, sub-section C.

OPTION II

1. Soil testing: Test compacted permeability of on-site materials to be used for compacted soil seals over current disposal area to determine that 10^{-6} cm/sec can be achieved.

2. Dry existing pond: Existing pond on site must be dried to allow operations in that area for placement of compacted seal. This will be accomplished by sprinkling pond water on a small area west of the pond at a low rate and during dry weather so that it evaporates and does not run off. No water would be allowed to accumulate in the pond for 2 weeks before other closure activities commence.

3. Site preparation: Grade refuse surface to approximate contour of final cap. Decontaminate equipment used in this step by washing exposed areas with a small amount of water while equipment is on top of refuse; equipment to exit so as to not spread contamination.

4. Cut-off trench and top seal: Excavate trench just beyond outer edge of refuse around disposal area, except southeast face. Place low permeability soil in this cut-off trench and along the south-east face and compact. Place and compact soil for top seal. Install vent. All actions in this step to be completed according to design, sub-section C.

5. Final grade: Disposal area, borrow areas, pond ditch and other new slopes to be final graded according to design, sub-section C.

6. Monitoring wells: To be installed as indicated in design, sub-section C.

7. Seeding: Top seal and other new slopes to be planted according to design, sub-section C.

8. Fence: To be installed (2 strands barbed wire, metal posts, one locked gate) at location shown in design, sub-section C.

OPTION III

1. Soil testing: Test compacted permeability of on-site materials to be used for compacted seals underneath and over new disposal area to determine that 10^{-6} cm/sec can be achieved.

2. Dry existing pond: Existing pond on site must be dried to allow operations in that area for placement of compacted seals and movement and placement of wastes in new disposal area. This will be accomplished by sprinkling pond water on a small area west of the pond at a low rate and during dry weather so that it evaporates and does not run off.

3. Liner under new disposal area: Move low permeability soil identified by Step 1 and place and compact for liner in new disposal area according to design, sub-section C.

4. Move waste: Move waste from old disposal area to new disposal area and place according to design, sub-section C.

5. Decontaminate equipment: Equipment which moved waste to new disposal area is to be cleaned by washing exposed areas with a small volume of water. Equipment would then exit so as to not spread contamination. Cover decontamination area and any waste spillage with 3" of soil to avoid recontamination. Since there

is no other equipment at the site, no other decontamination is required.

6. Top seal: Move low permeability soil identified by Step 1 to form top seal according to design, sub-section C. Install vent according to design, sub-section C.

7. Final grade: Old and new disposal areas, borrow areas, pond ditch and other new slopes to be final graded according to design, sub-section C.

8. Monitoring wells: To be installed as indicated in design, sub-section C.

9. Seeding: Top seal and other new slopes to be planted according to design, sub-section C.

10. Fence: To be installed (2 strands of barbed wire, metal posts, one locked gate) at location shown in design, sub-section C.

B. Schedule

The schedule for all closure steps is shown for Option I in Figure 2, Option II in Figure 3 and for Option III in Figure 4. Although the sequence for each step is indicated in these figures, certain steps may be accomplished out of sequence, or earlier than indicated. For example, monitoring wells might be installed earlier than shown and

FIGURE 2

OPTION I

CLOSURE IMPLEMENTATION SCHEDULE

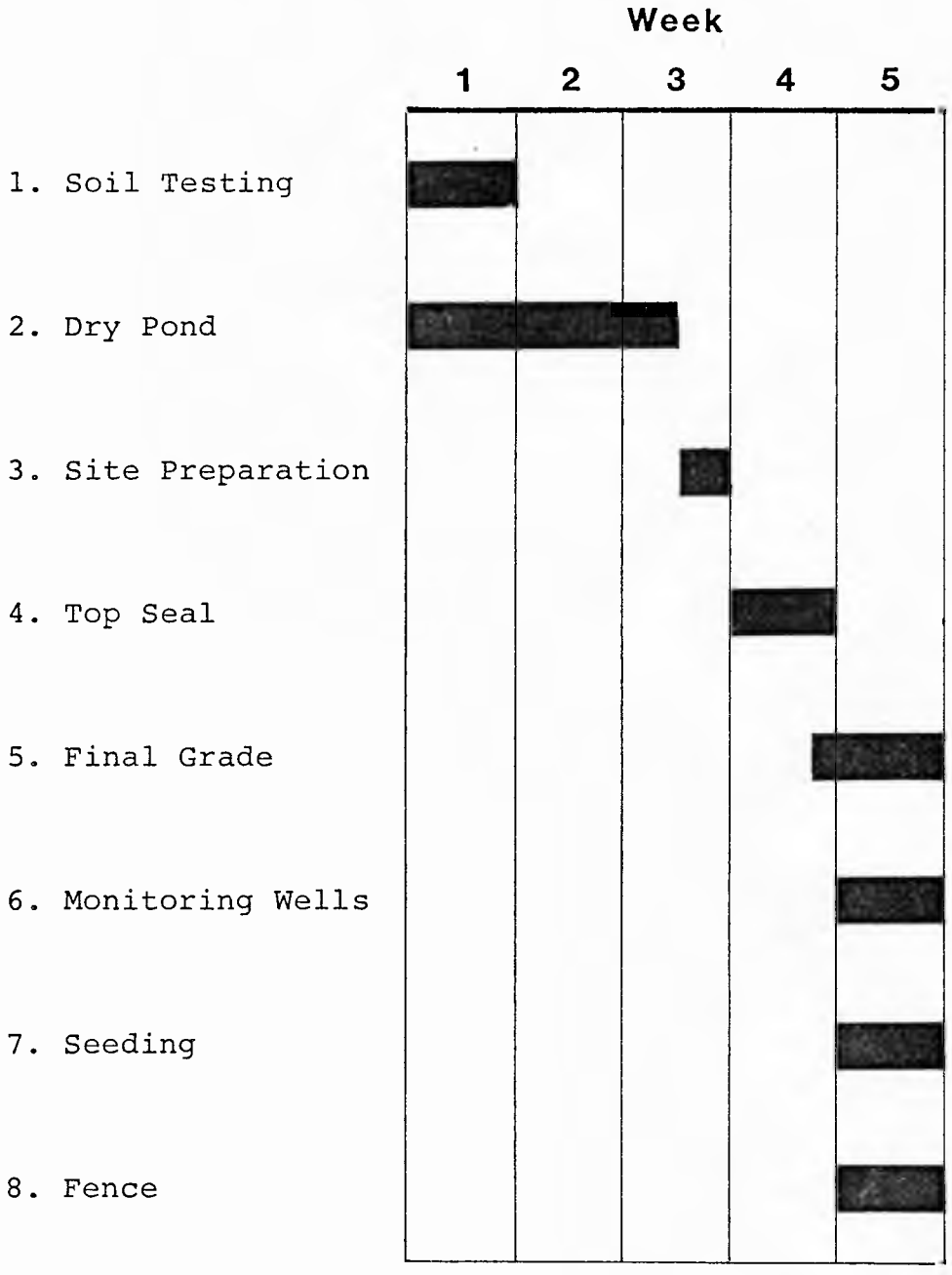


FIGURE 3

OPTION II

CLOSURE IMPLEMENTATION SCHEDULE

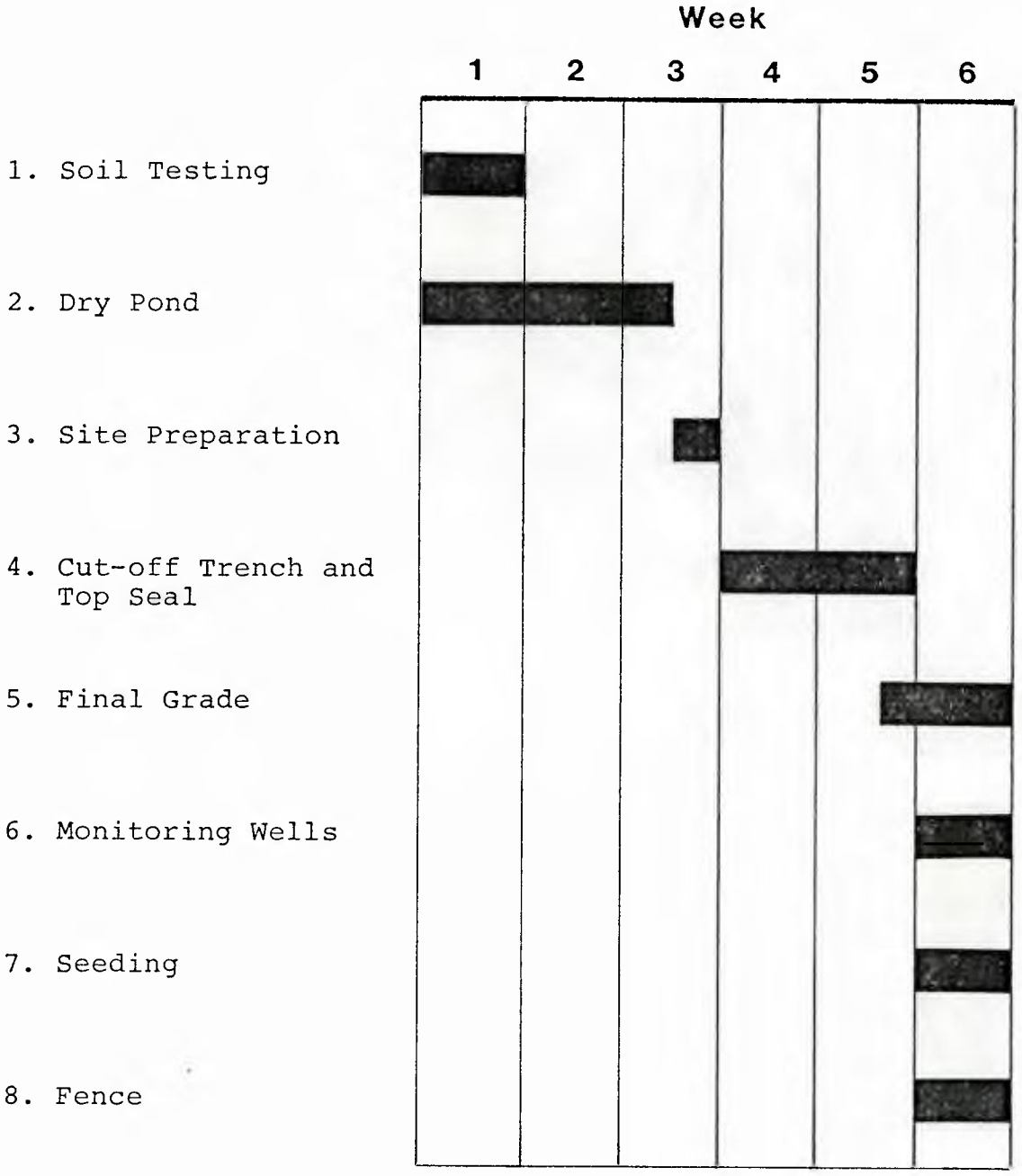
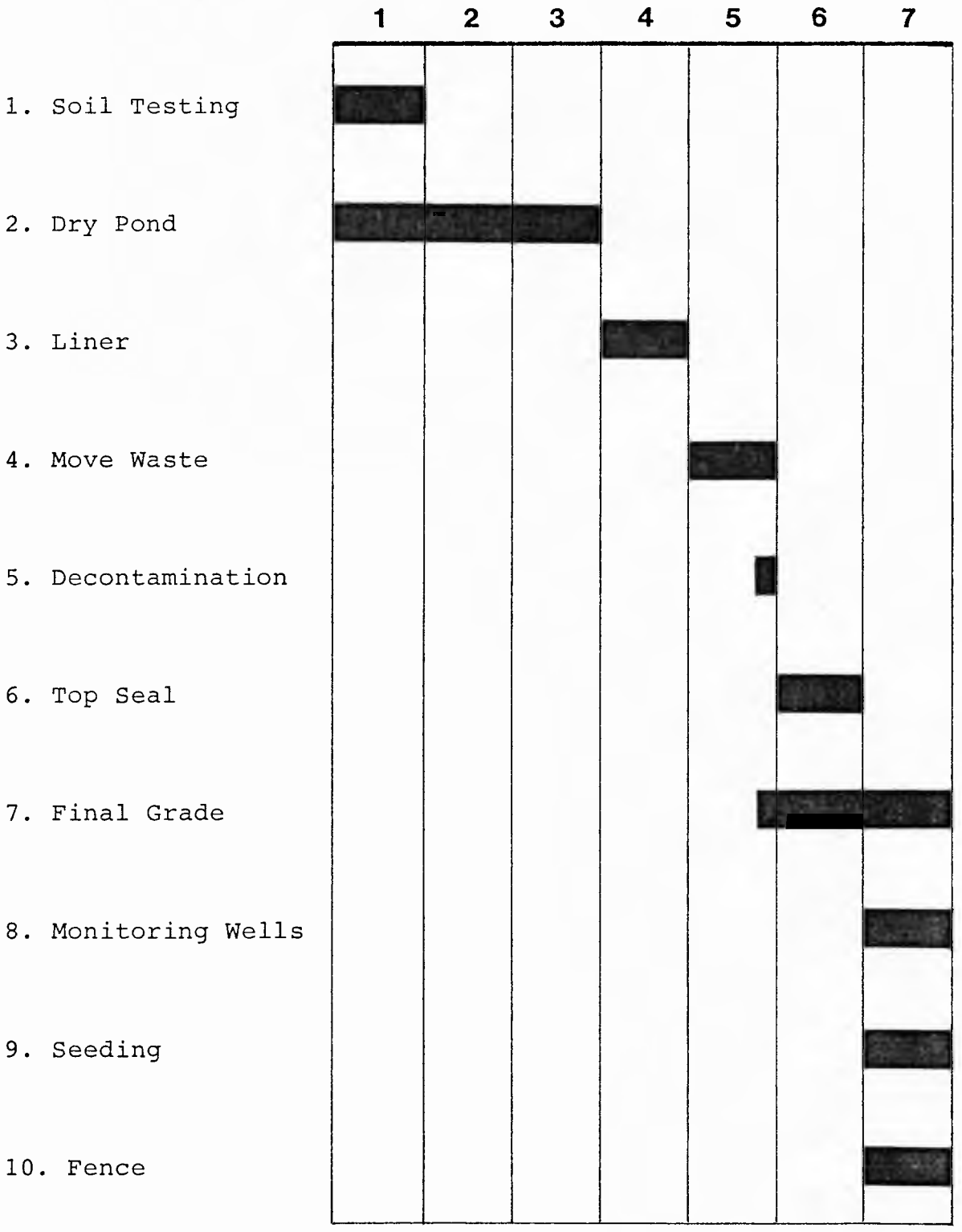


FIGURE 4

OPTION III

CLOSURE IMPLEMENTATION SCHEDULE



fencing might be started earlier than shown, if such action does not interfere with or compromise the integrity of other steps and the overall plan.

The notice of penalty requires this plan to commence within 30 days after notice to proceed is received. Accordingly on the schedules, Figures 2, 3 and 4, week No. 1 starts 30 days or less after receipt of notice to proceed.

If for reasons beyond the control of Pacific Wood Treating Corporation, the schedule above cannot be met, the Department of Ecology will be advised as soon as this becomes apparent so that a mutually agreeable amended schedule can be determined.

C. Closure Design

C.1 Waste Inventory

The volume of waste at the site is estimated to be 7,600 cubic yards (yd^3). This waste was placed at this location starting in 1979. Use of this site was terminated by Pacific Wood Treating Corporation in January, 1983. The waste consists of log deck and yard cleanup and boiler ash.

C.2 Leachate Mitigation

Leachate is generated at waste disposal sites when the decomposing waste becomes saturated with water. Decay and fermentation produces

gases and results in the discharge of organic acids. All disposal operations in western Washington become partially or totally saturated by winter precipitation, lateral infiltration and/or water table fluctuations. The rate or degree of saturation and the subsequent leachate production is a function of the bulk chemical composition, hydraulic conductivity and capacity of the soil cover to restrict infiltration of incident precipitation.

The only source of water for leachate generation at this site is infiltrating precipitation. All precipitation outside the limits of the refuse will be routed away from the refuse in perimeter ditches and either pumped to a drainage system or allowed to percolate without coming in contact with refuse.

Under all three options presented, the amount of infiltrating precipitatic will be minimized by placing a 1.5 foot compacted silty soil (ML) cap over the refuse. The compacted native soils will be amended, if necessary, to achieve an inplace permeability of 10^{-6} cm/sec or less. In addition, 1.5 feet of final soil cover sloped to promote surface runoff will be placed over the refuse. The final cover will be planted with winter rye and/or other appropriate seed mixes to allow maximum transpiration of infiltrating precipitation.

A water balance was calculated based on the above design criteria to conservatively predict potential volumes of leachate generated at this site. The assumptions utilized for these calculations are based on literature values and information collected during this investigation. The assumptions for the calculations are as follows:

TABLE 1

MOISTURE BALANCE FOR PROPOSED RBT SITE CLOSEOUT[1]

		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1.	T^2	38.40	43.10	47.10	51.30	57.20	62.10	66.80	66.50	62.80	53.30	46.70	42.40	53.00
2.	P	6.91	4.78	4.02	2.62	2.38	2.19	0.25	1.00	1.95	4.11	6.58	7.06	43.85
3.	I	0.59	1.37	2.19	3.18	4.75	6.22	7.75	7.65	6.44	3.68	2.10	1.24	47.16
4.	Unadj.Pet	0.02	0.03	0.04	0.06	0.08	0.10	0.12	0.12	0.10	0.07	0.04	0.03	
5.	PET	0.47	0.72	1.22	2.03	3.10	3.90	4.75	4.39	3.12	1.97	0.95	0.67	27.29
6.	C_{RO}[4]	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	
7.	RO	1.17	0.81	0.68	0.44	0.40	0.37	0.04	0.17	0.33	0.70	1.12	1.20	7.43
8.	i	5.74	3.97	3.34	2.18	1.98	1.82	0.21	0.83	1.62	3.41	5.46	5.86	36.42
9.	i-PET	5.27	3.25	2.12	0.15	-1.12	-2.08	-4.54	-3.56	-1.50	1.44	4.51	5.19	
10.	AccPot WL					-1.12	-3.20	-7.74	-11.30	-12.80				
11.	ST[3]	5.22	5.22	5.22	5.22	4.19	2.82	1.25	0.72	0.59	2.03	5.22	5.22	
12.	ΔST	0	0	0	0	-1.03	-1.37	-1.57	-0.53	-0.13	1.44	3.19	0	
13.	AET	0.47	0.72	1.22	2.03	3.01	3.19	1.78	1.36	1.75	1.97	0.95	0.67	19.12
14.	PERC	5.27	3.25	2.12	0.15	0	0	0	0	0	0	1.32	5.19	17.30

SYMBOLS: T is mean air temperature; P is precipitation; I is head index; Unadj PET is unadjusted potential evapotranspiration; PET is potential evapotranspiration; C_{RO} is the runoff coefficient; RO is the surface runoff; i is infiltration; Acc Pot WL is accumulated potential water loss; ST is storage; ΔST is change in soil moisture storage; AET is actual evapotranspiration; PERC is percolation.

NOTES:

1 From Thornthwaite-Mather, 1957. Also based upon EPA/530/SW-168 (Fenn, et.al., 1975) methodology and calculations for standard Thornthwaite-Mather tables.

2 Climatological data taken from weather station at Vancouver, Washington and Clark County Water Supply Development Plan.

3 Soil moisture holding capacity from soil survey of Clark County (U.S.D.A., S.C.S.). Assumes three feet of compacted silt/silt loam cover with an effective rooting depth of two feet.

- Three feet of final cover.
- Effective rooting depth of two feet.
- Runoff coefficient of .17, i.e. average of three options with Options I and II at .10 allowing more and Option III at .25 less percolation/generation.
- No restriction of infiltrating precipitation by the low permeability silt cap, i.e. making this calculation a worst case scenario.

Climatological infiltration data are taken from a literature review and/or available data. Estimates are based on an average year and it is assumed no percolation occurs during the months calculated as deficit.

Based on a total surface area of the completed, closed out landfill of 18,600 ft^2, a total annual leachate volume of 26,800 ft^3, is predicted by the Thornthwaite-Mather (1957) water balance under Options I and II. Using the same data base and a closed out area of 15,800 ft^2 for Option III, the generation volume is 22,700 ft^3/yr. This compares to a current generation volume estimated at 408,000 ft^3/yr (Hughes, et.al., 1971).

The specific chemical makeup of the leachate generated cannot be quantitatively projected. However, based on the "Preliminary Ground Water Investigation" data for the pond adjacent to the existing waste, off-site impacts are considered limited, see appended report. Only arsenic and PCP were above the detection limits in the pond water. Arsenic was below the Primary Drinking Water Standard. Also, the PCP level was below the human health water consumption limit without

on-site leachate generation or control measures. Capping and/or lining will only serve to further reduce these levels and minimize any potential off-site impacts.

facility's impact on the quality of ground water in the uppermost aquifer underlying the facility

C.3 Ground Water Monitoring

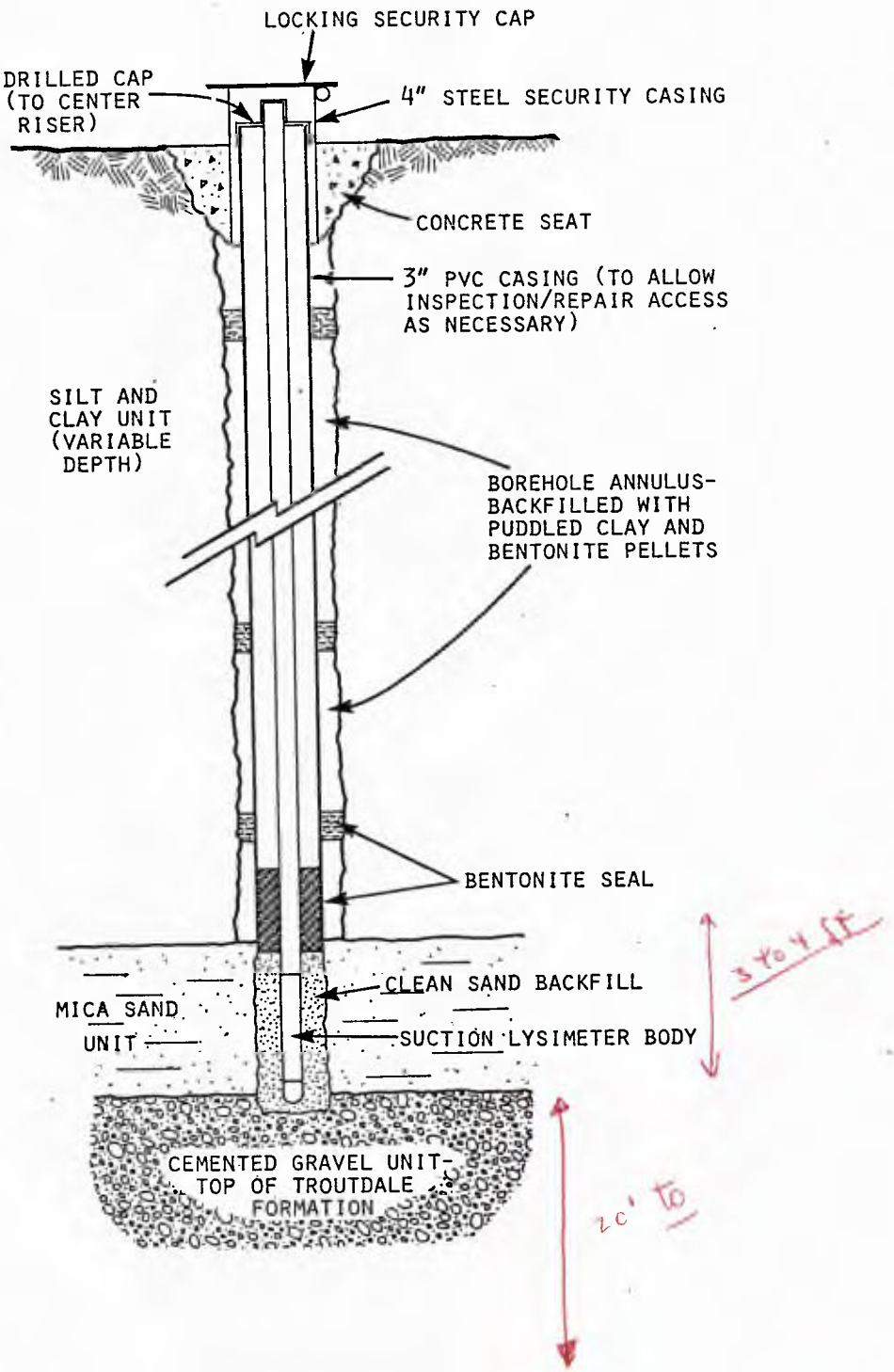
Based on, 1) moisture balance developed above; 2) description of the saturated and unsaturated zones in the appended data; and 3) the proximity of the facility to existing or potential water supplies and surface water described in the appended data, a ground water monitoring program for post-closure implementation has been developed. The plan focuses on the **uppermost saturated zone**, **perched ground water above the cemented gravel unit** and generally reported in the mica sand unit below the silt and clay. Although it may be only seasonally saturated, monitoring moisture movement in this unit will provide the earliest possible warning of any significant contaminant movement.

wells ?

Under Options I and II, there will be a background lysimeter installed in the northeast corner of the property as well as one at the east edge and two along the west edge of the capped refuse, in order to comply with the waste boundry requirements, see Figures 5 and 7. Under Option III, the background lysimeter remains in the northeast corner, two additional lysimeters are located further to the west and the toe drain/collector at the edge of the waste provides one additional down-gradient data point, see Figure 10. It is expected that suction lysimeters may require periodic replacement due to clogging or damage. If during the wet winter months it is not possible to

FIGURE 5

SUCTION LYSIMETER MONITOR



obtain water samples for testing, the lysimeter(s) will be removed, inspected and repaired or replaced as necessary to comply with current regulatory monitoring requirements, see Figure 5.

C.4 Design Description and Options

The closure design options described herein, 1) consider the hydrogeologic conditions at the RBT site as described in the appended report; 2) maximize the use of available on-site materials; and 3) serve to minimize the potential for off-site migration of any contaminants. The designs depend upon the use of compacted soil caps, cutoff walls and/or liners in each of the three options described.

A comprehensive monitoring program is specifically tailored to each design option. Monitoring is focused on the uppermost saturated zone and the specific down-gradient monitors are placed at the edge of the waste.

On-site soils include fine grained silts and clays as evidenced by the historic use of the RBT pit as a brick yard. All soils used for compacted low permeability caps and/or liners will be tested to ensure a compacted permeability of 10^{-6} cm/sec or less. Where necessary, an appropriate soil amendment will be used to achieve this end.

Inventorying the available soil materials on the RBT property while allowing for responsible drainage and site reclamation has shown the adequate volumes are available for any selected option, see Table 2.

TABLE 2

RBT SITE CLEAN ON-SITE SOIL AVAILABILITY

South flats area	8000 yd^3
North & east of refuse	4000 yd^3
Hillslope above pond*	1540 yd^3

*Only available under Option III.

Soils testing and preconstruction site preparation including the pond drainage schedule have been described. Specific construction tasks and suggested scenarios for construction sequences are described for each of the options in the following text. Figures schematically depicting existing topography (Figure 6), the layout, cuts, fills and approximate final grades are included for each option.

OPTION I: Cap in place with compacted cover over exposed face and drainage outlet from pond area.

Figures 7 and 8 show the layout, existing and suggested final grades for Option I. A summary of construction tasks for this option include:

0) Grade refuse surface to approximate contour of final cap configuration.

1) Prepare base of southeast refuse face for compacted soil barrier placement.

2) Excavate ±3800 yd^3 from south flats area, place and compact along southeast refuse face and over refuse area.

N.W. 289th Street

DITCH

PROPERTY LINE

DITCH

D'

E'

200

205

210

215

220

BOREHOLE
BH-1

A

A'

225

195

DRAIN PIPE

WAREHOUSE

REFUSE
AREA

PROPERTY LINE

230

235

C'

PROPERTY LINE

DITCH

CULVERT

B

B'

BOREHOLE
BH-2

195

200

205

210

215

PILE

220

225

230

235

240

PROPERTY LINE

C

D

E

NOTES

1. BASE MAP MODIFIED AFTER PACIFIC WOOD TREATING SURVEY.
2. CONTOUR INTERVAL IS FIVE FEET.
3. INDICATED CROSS-SECTIONS ARE DETAILED ON FIGURE 8 & 9.

N

0 50 100

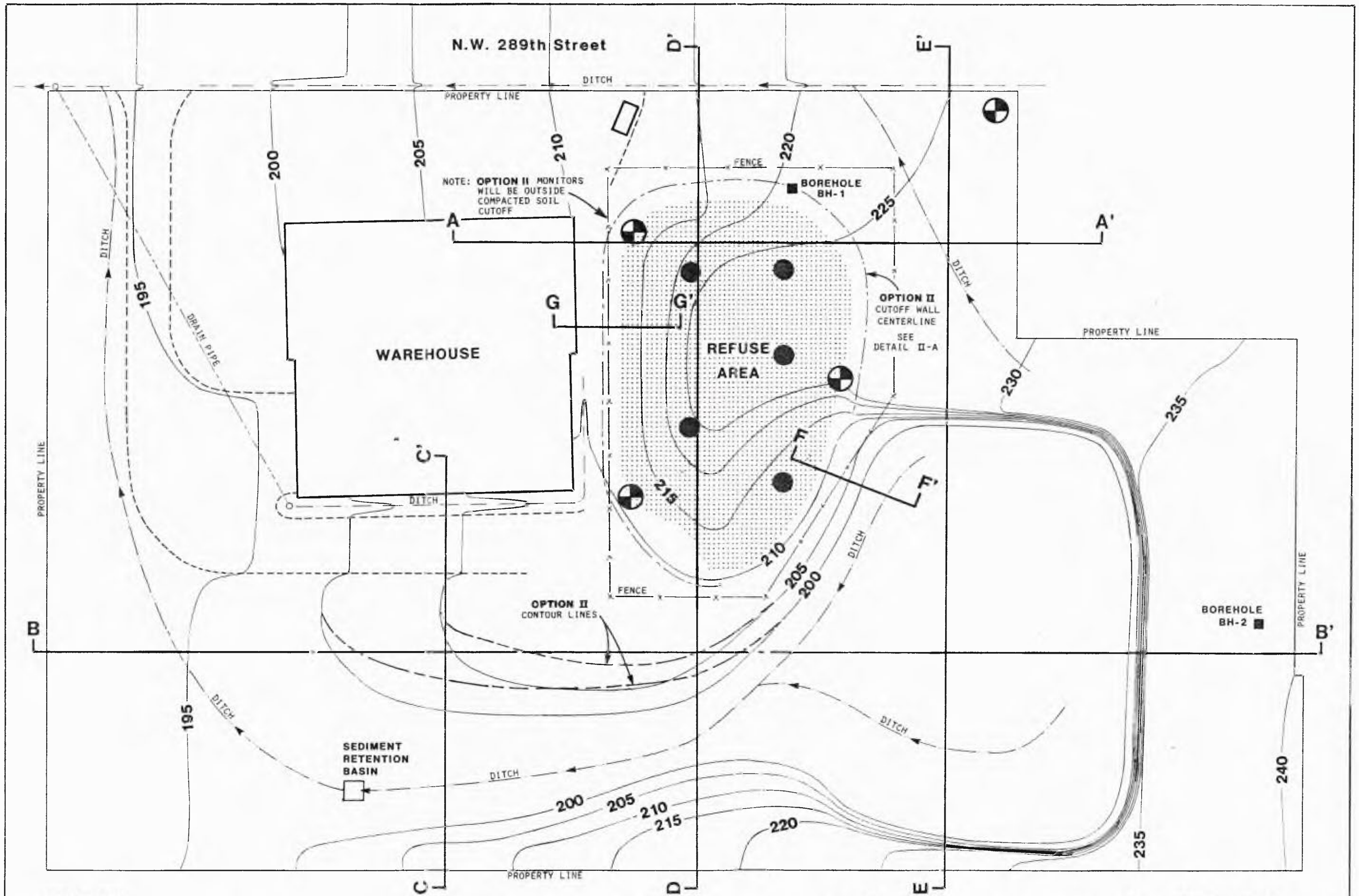
SCALE (Feet)

Sweet, Edwards & Associates, Inc.
P.O. Box 328 • Kelso, WA 98626 • 206-423-3580

IN ASSOCIATION WITH:
PATRICK H. WICKS, P.E.
CONSULTANT IN HAZARDOUS WASTE MANAGEMENT

RBT SITE
Existing Topography

Figure 6


N.W. 289th Street
D
E
DITCH
PROPERTY LINE
200
205
210
220
FENCE
NOTE: OPTION II MONITORS WILL BE OUTSIDE COMPACTED SOIL CUTOFF
BOREHOLE BH-1
225
A
A'
DITCH
195
DRAIN PIPE
G
G'
OPTION II CUTOFF WALL CENTERLINE
SEE DETAIL II-A
WAREHOUSE
REFUSE AREA
PROPERTY LINE
230
235
C
F
F'
215
DITCH
210
205
200
DITCH
FENCE
OPTION II CONTOUR LINES
B
B'
BOREHOLE BH-2
PROPERTY LINE
195
DITCH
SEDIMENT RETENTION BASIN
DITCH
DITCH
200
205
210
215
220
240
235
PROPERTY LINE
C
D
E
EXPLANATION
MONITOR SITE
GAS VENT
FOR NOTES SEE FIGURE 6.
N
0
50
100
SCALE (Feet)
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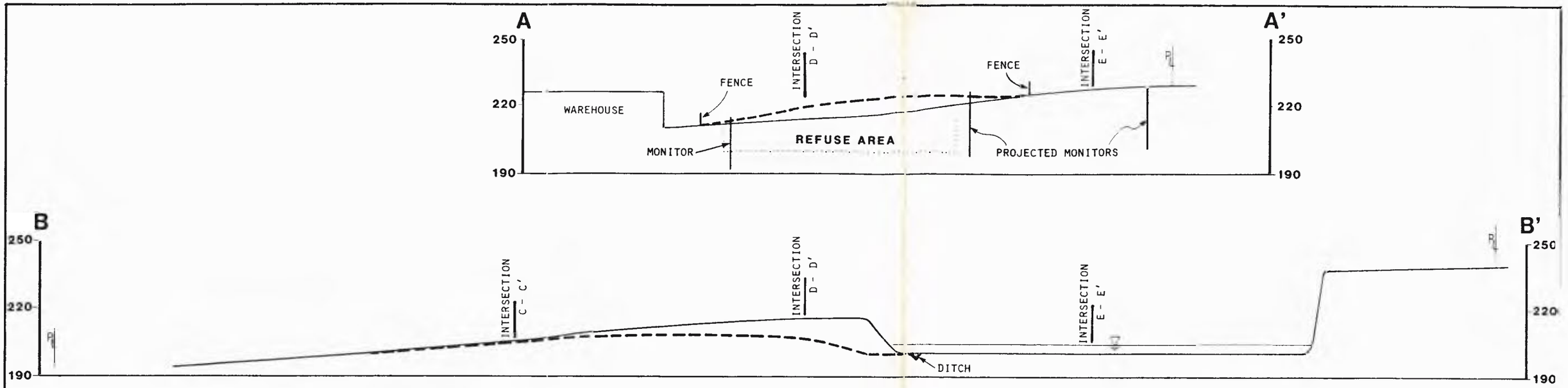
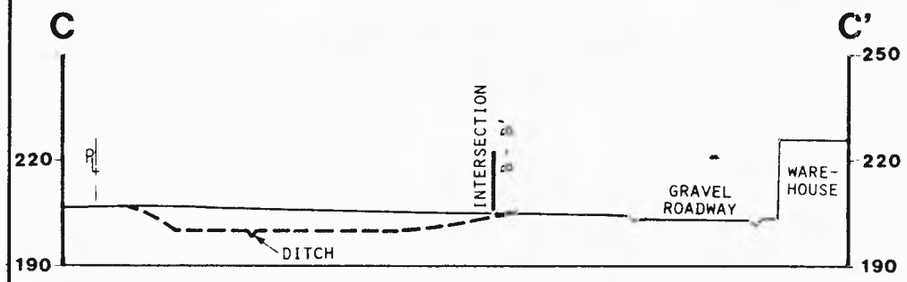
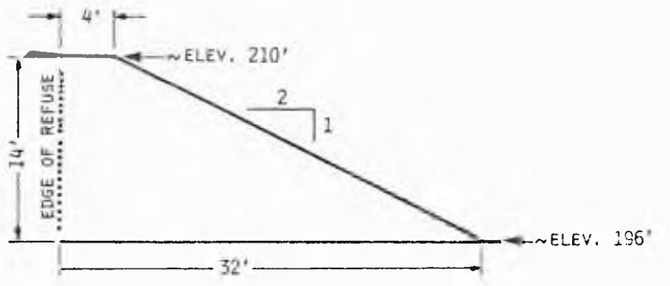
IN ASSOCIATION WITH:
PATRICK H. WICKS, P.E.
CONSULTANT IN HAZARDOUS WASTE MANAGEMENT
RBT SITE
OPTION I & II
Final Topography
Figure 7

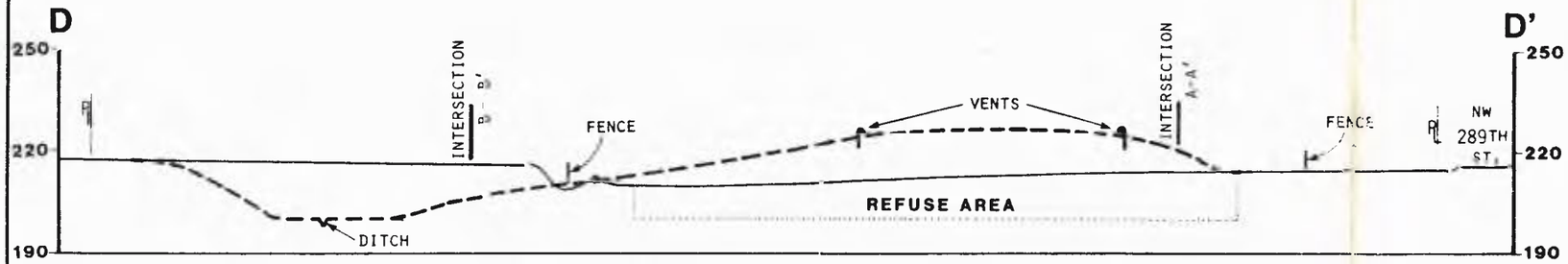


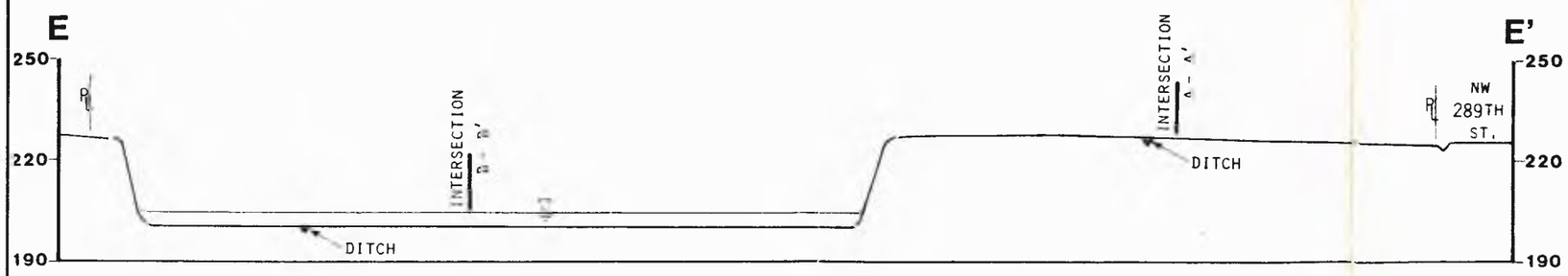


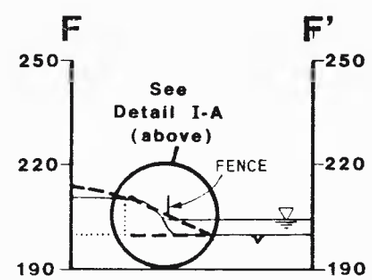


DETAIL I-A

COMPACTED SOIL BARRIER







NOTE: BOLD DASHED LINES INDICATE PROPOSED CUTS AND FILLS.

0 50 100

SCALE (Feet)

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IN ASSOCIATION WITH:
PATRICK H. WICKS, P.E.
CONSULTANT IN HAZARDOUS WASTE MANAGEMENT

RBT SITE OPTION I

Cross - Sections

Figure 8

3) Final grade and slope capped refuse for grass seeding.

4) Final grade, slope and ditch pond area for drainage; prepare for seeding.

5) Seed refuse cap and excavated areas with winter rye or other appropriate grass seed mix to maximize evapotranspiration and provide necessary erosion control in borrow and cutslope areas.

6) Install one up-gradient or background and three down-gradient suction lysimeters for monitoring any contaminated moisture movement in the mica sand unit or just above the cemented gravel.

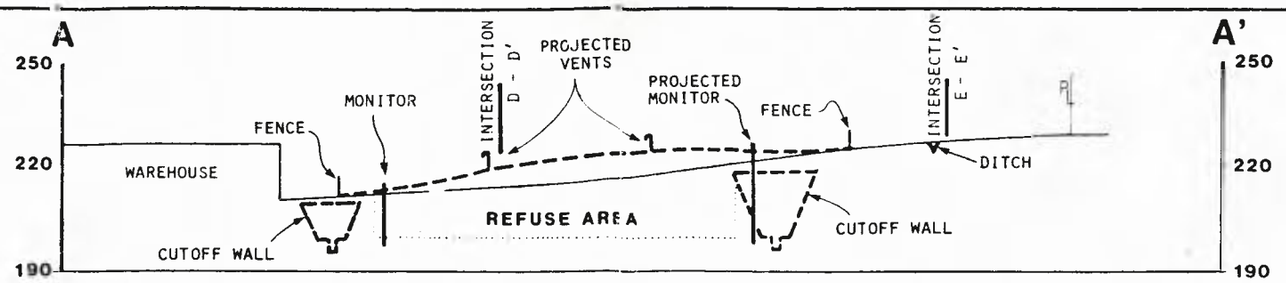
7) Install passive gas venting system to include five vertical standpipes in gravel collection sumps as shown on Figure 12.

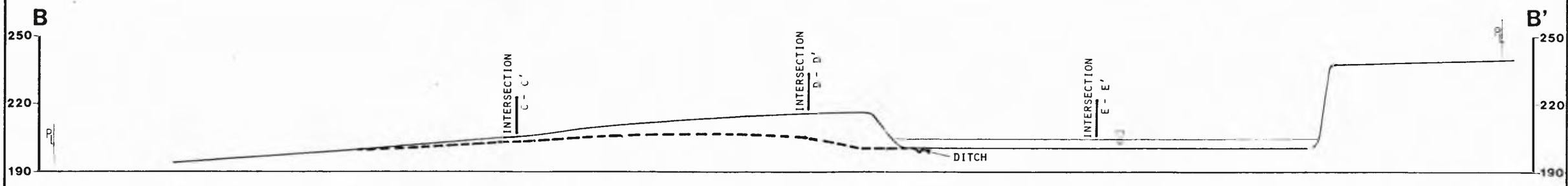
Selection of Option I will preclude development or use of the finally capped and fenced off area for up to 20 to 30 years or until fill subsidence is negligible.

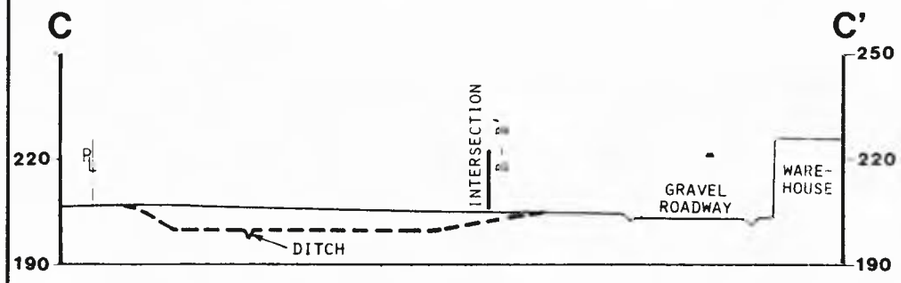
OPTION II: Cap in place with perimeter cutoff walls to the top of the cemented gravel.

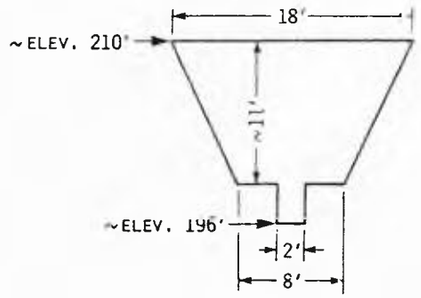
Figures 7 and 9 show the layout, existing and suggested final grades for Option II. A summary of construction tasks for this option include:

0) Grade refuse surface to approximate contour of final cap configuration.



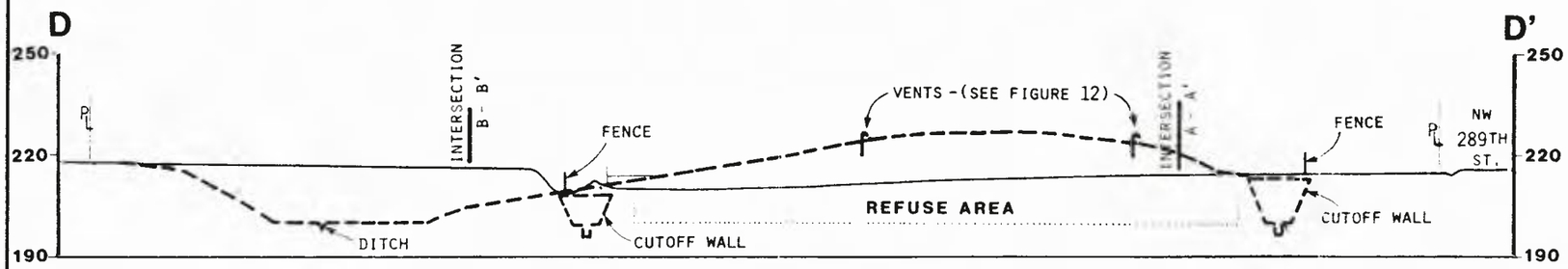


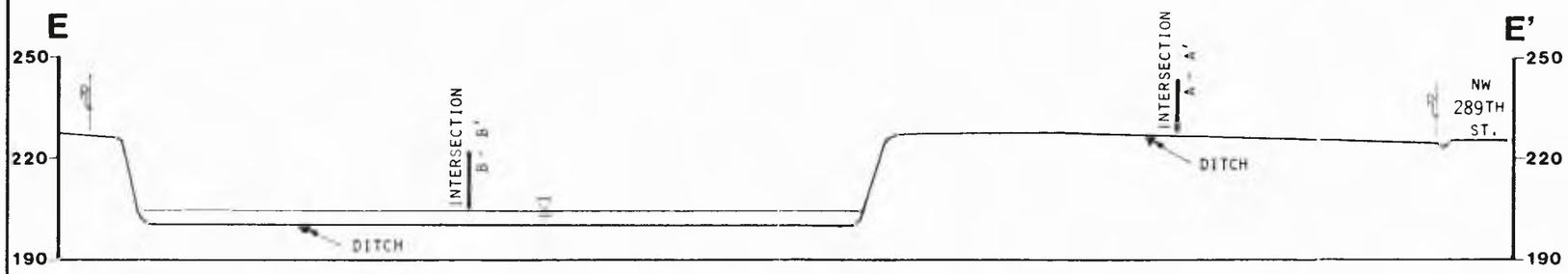


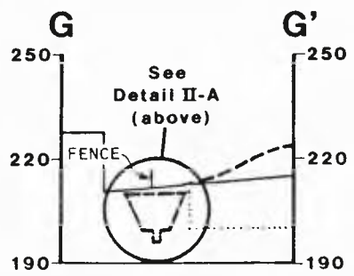


DETAIL II-A

COMPACTED SOIL CUTOFF WALL







NOTES: 1. CROSS SECTION F-F' AND DETAIL I-A ALSO APPLY TO OPTION II (SEE FIGURE 8.)

2. BOLD DASHED LINES INDICATE PROPOSED CUTS AND FILLS.

0 50 100

SCALE (Feet)

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IN ASSOCIATION WITH:
PATRICK H. WICKS, P.E.
CONSULTANT IN HAZARDOUS WASTE MANAGEMENT

RBT SITE OPTION II

Cross - Sections

Figure 9

1) Excavate ±450 feet of trench with approximately 2500 yd^3 of material to be placed on refuse surface.

2) Excavate ±4300 yd^3 from south flats area, place and compact in trench and along southeast face of exposed waste area.

3) Final grade and slope capped refuse for grass seeding.

4) Final grade, slope and ditch pond area drainage; prepare for seeding.

5) Seed refuse cap and excavation areas with winter rye or other appropriate grass seed mix to maximize evapotranspiration and provide necessary erosion control in borrow and cutslope areas.

6) Install one up-gradient or background and three down-gradient suction lysimeters for monitoring any contaminated moisture movement in the mica sand unit or just above the cemented gravel.

7) Install passive gas venting system to include five vertical standpipes in gravel collection sumps as shown on Figure 12.

Like Option I, this program will also preclude development or use of the finally capped and fenced off area for 20 to 30 years or until fill subsidence is negligible.

OPTION III: Lined and capped refuse cell against east pond wall with permanent drain and site regrade.

Figures 10 and 11 show the layout, existing and suggested final grades for Option III. A summary of construction tasks for this option include:

0) Drain pond and excavate refuse cell base through the mica sand or to the cemented gravel.

1) Excavate ±2000 yd^3 from the south flats area, place and compact for base in the refuse cell area.

2) Place refuse in 0.5 to 1 foot lifts with concomitant compaction in the cell, note placement and compaction at 3:1 slope for maximum effectiveness and preferred moisture routing control.

3) Excavate, place and compact ~~1.5~~ 1.5 feet of soil from above the refuse cell downslope over the cell with subsequent placement of 1.5 feet of topsoil, note selectively set aside topsoil for use as final 1.5 feet.

4) Final grade, slope and ditch refuse cap, pond area and general area; prepare for seeding.

5) Seed refuse cap with winter rye or other appropriate grass seed mix to maximize evapotranspiration and provide necessary erosion control in borrow and cutslope areas.

6) Install refuse toe drain one up-gradient or background and two downgradient suction lysimeters for monitoring any contaminated moisture movement in the mica sand unit or just above the cemented gravel.

N.W. 289th Street

D'

E'

DITCH

PROPERTY LINE

DITCH

DITCH

200

205

210

220

215

210

BOREHOLE
BH-1

A

A'

195

DRAIN PIPE

DITCH

WAREHOUSE

205

200

PROPERTY LINE

DITCH

PROPERTY LINE

C'

DITCH

CULVERT

DITCH

TOE DRAIN

REFUSE
AREA

BOREHOLE
BH-2

PROPERTY LINE

B

B'

195

FENCE

SEDIMENT
RETENTION
BASIN

DITCH

200

205

210

215

220

225

230

235

240

DITCH

PROPERTY LINE

C

D

E

EXPLANATION

MONITOR SITE

RISER

GAS VENT

LATERAL

FOR **NOTES** SEE FIGURE 6.

N

0 50 100

SCALE (Feet)

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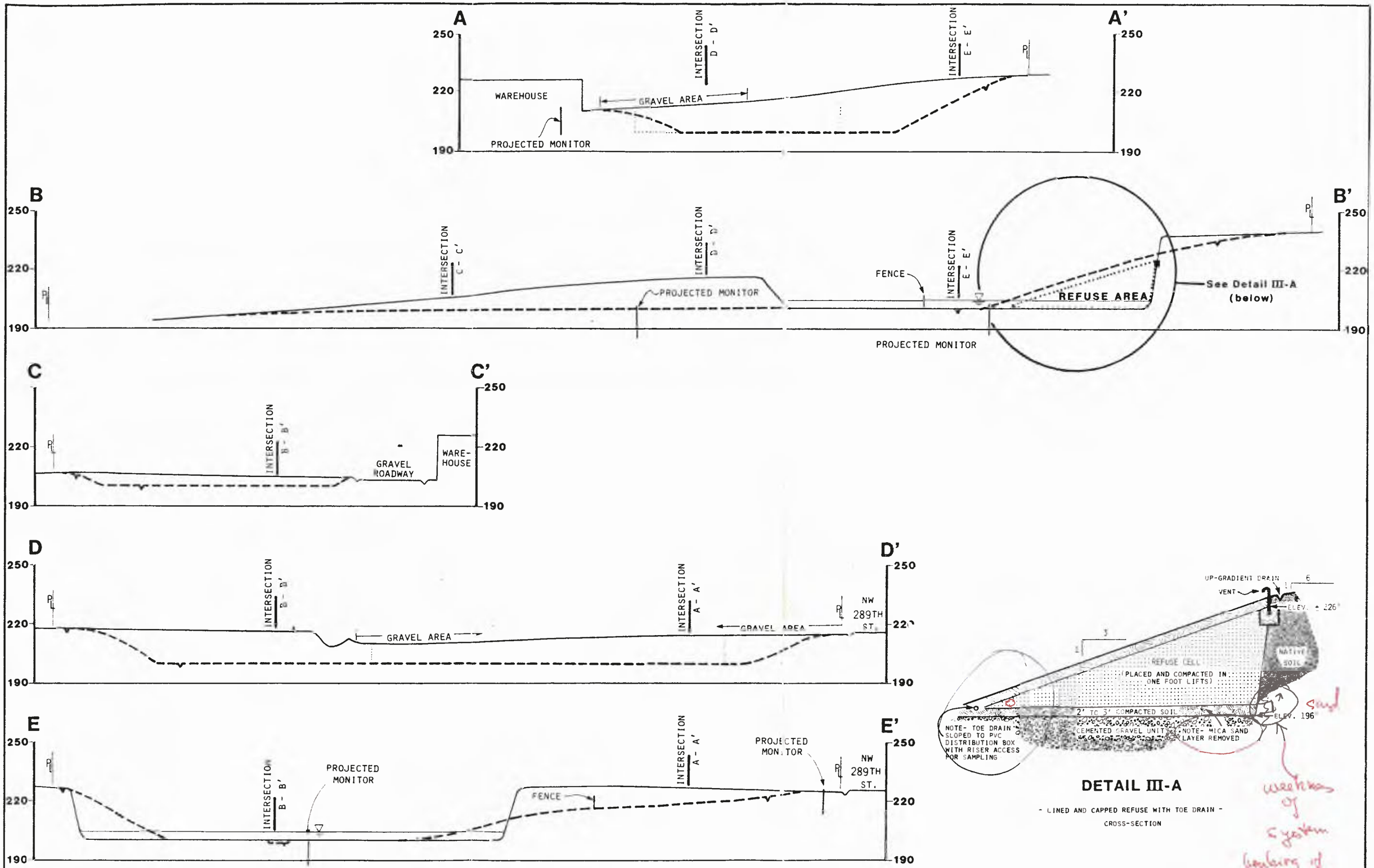
IN ASSOCIATION WITH:
PATRICK H. WICKS, P.E.
CONSULTANT IN HAZARDOUS WASTE MANAGEMENT

RBT SITE OPTION III

Final Topography

Figure 10



DETAIL III-A

- LINED AND CAPPED REFUSE WITH TOE DRAIN -
CROSS-SECTION

NOTE: BOLD DASHED LINES INDICATE PROPOSED CUTS AND FILLS.

0 50 100
SCALE (Feet)

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IN ASSOCIATION WITH:
PATRICK H. WICKS, P.E.
CONSULTANT IN HAZARDOUS WASTE MANAGEMENT

RBT SITE OPTION III

Cross - Sections

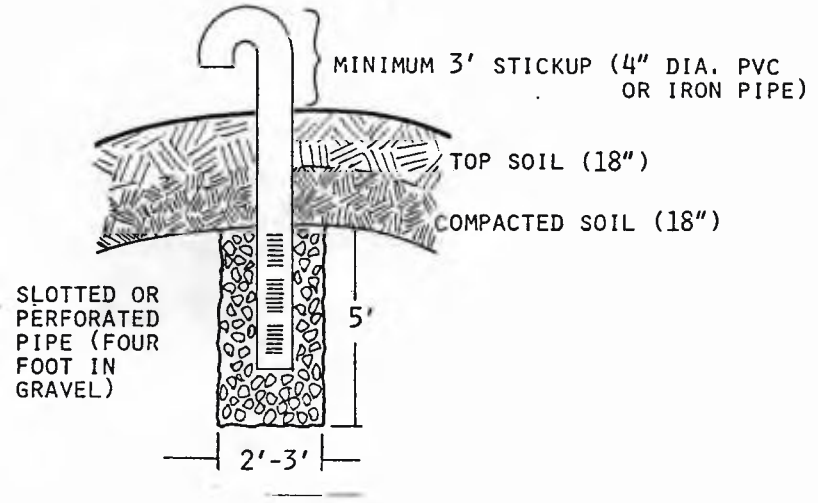
Figure 11

weekness of system leading of water

FIGURE 12

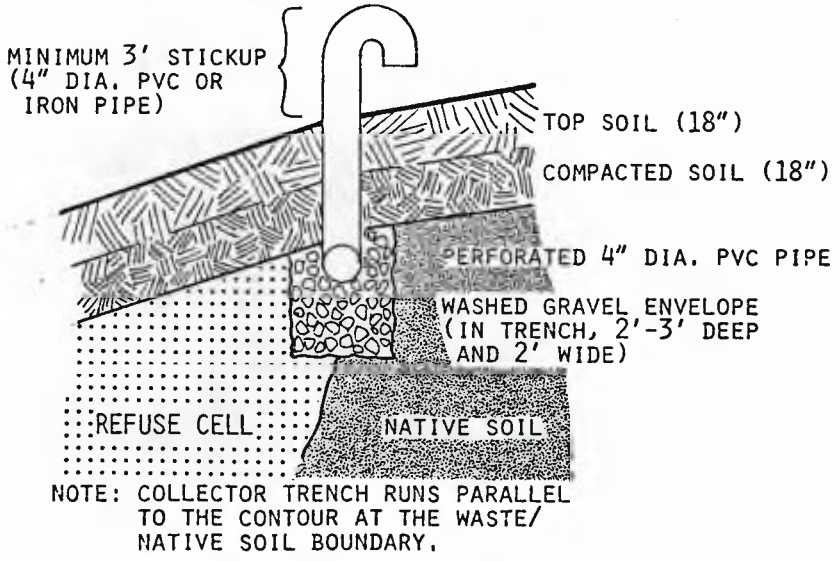
PASSIVE GAS VENTING SCHEMATIC

OPTION I AND II



OPTION III

(SEE FIGURE 10 FOR PLACEMENT OF THREE RISERS)



NOTE: COLLECTOR TRENCH RUNS PARALLEL TO THE CONTOUR AT THE WASTE/ NATIVE SOIL BOUNDARY.

7) Install passive gas venting system to include three vertical standpipes connected to a perforated horizontal collector encased in a washed gravel envelope as shown on Figure 12.

Under Option III, the cell containment area which is capped and fenced will not be available for development or use for up to 20 to 30 years. This option does result in a lower leachate generation than I and II, primarily due to increased runoff on the sloping surface and the reduced surface area.

Option III monitoring at the edge of the waste is facilitated through placement of French or toe drains. Placement and compaction of the waste on a 3:1 slope will result in selective moisture routing along the bedding planes if any saturated flow develops. This will allow for the earliest detection at the toe drain. Also, should excessive amounts or unacceptable levels of leachate contaminants be encountered, this option would allow for collection of said leachate through the addition of a holding tank and appropriate disposal of that leachate.

It should also be noted that the final grade near the warehouse for this option may be modified beyond that shown in Figure 10 to improve the utility of this building. Such modified grading will not, however, adversely affect the performance of this option.

D. Compliance with 40 CFR 265.310

As required by the above-referenced Federal regulation, the objectives of the closure plan are to:

1. Control pollutant migration from the site via ground water and surface water.

2. Control surface water infiltration, including prevention of pooling; and

3. Prevent erosion on the top seal.

The closure plan, Options I, II and III as described herein, will accomplish these objectives in the following manner. Contact with surface water and infiltration will be minimized since the waste will be covered with a relatively impermeable top seal and grass for evapotranspirative uptake. Isolation of the waste from surface water, elimination of pooling of water adjacent to the waste and proper drainage will also contribute to minimizing ground water and surface water contamination. Erosion will be controlled by establishing a proper slope on the top seal and seeding with grass to retain the soil in place. For Option III, the bottom seal (liner) will further reduce any exfiltration of potentially contaminated water from the waste into underlying soil.

Regulation 40 CFR 265.310 states that pollutant migration via air should also be controlled. However, the wastes in this case should not present an air pollution problem even if uncontrolled, i.e., without closure as described in this plan. Nonetheless, this closure plan will control any air emissions if they were of concern because the wastes will be covered after closure is completed, whereas they were not covered prior to closure.

It should also be noted that all factors listed in 40 CFR 265.310(c) were considered in developing this plan.

E. Certification

Within three months after the closure is complete, same will be certified to the Washington Department of Ecology and U.S. Environmental Protection Agency as specified in 40 CFR 265.115. The independent registered professional engineer, hydrogeologist and Pacific Wood Treating Corporation official, who are to make such certification, will periodically observe activities at the site during closure.

independent registered PE

DRAFT

POST-CLOSURE PLAN

FOR

RIDGEFIELD BRICK AND TILE SITE

RIDGEFIELD, WASHINGTON

INTRODUCTION

This plan has been developed to be consistent with and meet the requirements of applicable portions of certain Federal regulations, specifically 40 CFR 265, subpart G (265.100 - 265.120) and 40 CFR 265.310, as directed by Washington Department of Ecology Notice of Penalty No. 83-284. This action described below will be conducted by Pacific Wood Treating Corporation or its contractors, unless otherwise noted.

INSPECTIONS

After closure is complete according to the closure plan for this site, the site will be inspected by a designee of the Plant Manager of Pacific Wood Treating Corporation. During these inspections, the following will be observed and noted on an inspection form or log book:

A. Condition of grass cover on top seal.
B. Evidence of erosion, settling, cracks or disturbance on top seal.
C. Any ponding of water on the site.
D. Drainage way to ditch.
E. Other new erosion.
F. Evidence of entry onto site.
G. Condition of fence and gate.
H. Condition of gas vent.
I. Condition of survey benchmarks/markers.

During the first six months of the post-closure period, inspections for Items A through G will be performed twice monthly. During the second six months of the post-closure period, Items A through G will be inpsected once per month and thereafter once per quarter. Items H and I will be inspected once per quarter throughout the post-closure period.

MAINTENANCE

Any deficiencies noted during inspection shall be reported to the Plant Manager and appropriate corrective action taken to maintain the effectiveness of the top seal, minimize ponding on the site, minimize disturbance of the site and generally retain its security.

GROUND WATER MONITORING, SAMPLING AND ANALYSIS

Sample collection, at the lysimeters installed under the closure plan, will involve measuring the depth to water if perched water is available or placing a vacuum on the lysimeter. Samples will be pumped from the lysimeter with a peristaltic pump where lift allows this practice. Pressure evacuation of the lysimeter will be used where pumping lift limitations dictate. Simple pumping from an access port in the toe drain included for Option III will provide for samples. Field measurements of temperature, electrical conductivity and/or pH will be conducted when possible. Field filtering of turbid samples will be completed when necessary, with or without split samples as directed by the DOE.

Samples will be collected in containers supplied by a State Certified Laboratory with appropriate preserving agent(s) as prescribed in Standard Methods for the Analysis of Wastewater (1970), Methods for Chemical Analysis of Water and Wastes (1979), and/or other regulatory direction. Transport in ice chests and laboratory testing as per above references will be conducted. Chain of custody control will be assured through use of the form shown on Figure 13.

During the **first year** following completion of the closeout, there will be quarterly sampling of the following constituents:

1) Primary Drinking Water Standards:

Arsenic
Barium
Cadmium
Chromium
~~**Fluoride**~~
Lead
Mercury
Nitrate
Selenium
Silver
~~Coliform bacteria~~

(Note: Pesticides, etc. not considered necessary for this waste type.)

2) General Ground Water Quality:

Chloride
Iron
~~Manganese~~
Phenols
~~Sodium~~
Sulfate

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Environmental Geology, Ground Water, Engineering Geology & Drilling Services

Well or Surface Site Number _____

Date, Time _____

FIGURE 13

CHAIN OF CUSTODY CONTROL
SURFACE AND GROUND WATER SAMPLING
FIELD DATA SHEET

PROJECT _____ CLIENT _____

WEATHER _____

HYDROLOGY MEASUREMENTS:

Depth to Water Below Measuring Point:

(Nearest .01 ft.	Elevation	Date, Time	Method Used, M-Scope Number or Other

WELL EVACUATION:

Gallons	Pore Volumes	Method Used	Rinse Method	Date, Time

Surface Water Flow Speed _____ Measurement Method _____ Date, Time _____

SAMPLING:

Sample Number	Date, Time	Volume (ml)	Container Type	Depth Taken	Field Filtered (yes,no)	Preserva-tive	Iced (yes,no)	Sampler Cleaning Method

FIELD WATER QUALITY TESTS:

Sample Number	pH	DO (mg/l)	Specific Conductivity	Temp				

TRANSPORT AND CUSTODY:

SEA Field Personnel	Other Field Personnel	Sample Number	Container Number	Transport To Lab By:	Shipped To Lab By:	Shippers Lading Number

Date of Shipment	Time of Shipment

Signature of SEA or Other Personnel _____ Date _____

3) Ground Water Contamination:

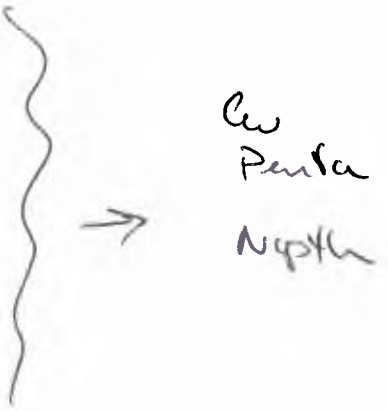
pH

Specific Conductance

Total Organic carbon

Total Organic Halogen

(Note: Four replicate samples to be collected for each sample for first year.)



During the first year of sampling and testing, reports in compliance with 40 CFR 265.93 and .94 will notify the regulatory agencies of results and identify monitors which exceed maximum Primary Drinking Water Standards. This will be done quarterly for the first year and annually or as necessary for compliance ~~in the following~~ years.

DESIGNATED CONTACT

The Plant Manager of Pacific Wood Treating Corporation, 111 West Division Street, Ridgefield, Washington 98642, (206) 887-3562, is the designated company contact under this plan. An updated copy of this plan will be kept at the office of the Plant Manager during the post-closure care period.

MODIFICATIONS

Any modifications to this plan will be submitted to the U.S. Environmental Protection Agency and Washington Department of Ecology in accordance with 40 CFR 265.118 (e) and (f).

SURVEY PLAT

Within 90 days after closure is complete, a survey plat and other information will be submitted to the U.S. Environmental Protection Agency, Washington Department of Ecology and Clark County as required by 40 CFR 265.119. This survey will document monitor locations and reference elevations, etc.

CERTIFICATION

Within 3 months after closure is complete, same will be certified to the Washington Department of Ecology and U.S. Environmental Protection Agency as specified in 40 CFR 265.115.

COMPLIANCE WITH 40 CFR 265.310

As required by the above-referenced Federal regulation, the objectives of this post-closure plan are to:

1. Control pollutant migration from the site via ground water and surface water.

2. Control surface water infiltration, including prevention of pooling; and

3. Prevent erosion on the top seal.

This post-closure plan will accomplish those objectives in the following manner. Contact with surface water and infiltration will be minimized since the waste will be covered with a relatively impermeable top seal and grass for evapotranspirative uptake. Isolation of the waste from surface water, elimination of pooling of water adjacent to the waste and proper drainage will also contribute to minimizing ground water and surface water contamination. Erosion will be controlled by establishing a proper slope as the top seal and seeding with grass to retain the soil in place. For Option III, bottom seal (liner) will further reduce an exfiltration of potentially contaminated water from the waste into ground water.

Inspection and maintenance activities as described herein will assure that these safeguards continue to function as intended.

Regulation 40 CFR 265.310 states that pollutant migration via air should also be controlled. However, the wastes in this case should not present an air pollution problem even if uncontrolled, i.e., without closure. Nonetheless, closure actions will control any air emissions if they were of concern because the wastes will be covered after closure is completed, whereas they were not covered prior to closure. It should also be noted that all factors listed in 40 CFR 265.310(c) were considered in developing this plan.

REFERENCES

FENN, Dennis G., Keith J. Hanley, and Truett V. DeGeare, 1975, Use of the Water Balance Method For Predicting Leachate Generation From Solid Waste Disposal Sites: U.S. Environmental Protection Agency EPA/530/SW-168, p. 40.

HUGHES, G. M., R. A. Landon, and R. N. Farvolden, 1971, Hydrogeology of Solid Waste Disposal Sites in Northeastern Illinois: Illinois State Geology Survey under E.P.A. demonstration grant G06-EC-00006, p. 154.

Standard Methods for the Examination of Water and Wastewater, 13th edition, 1970, American Public Health Association.

THORNTHWAITE, C. W., and J. R. Mather, 1957, Instructions and Tables for Computing Potential Evapotranspiration and the Water Balance: Drexel Inst. of Tech., Lab of Climatology, Pub. in Climatology, v. X, No. 3.

U. S. Environmental Protection Agency, 1979, Methods for Chemical Analysis of Water and Wastes: EPA-600/4-79-020.

APPENDIX

RBT Site Preliminary Ground Water Investigation

RBT SITE

Preliminary Ground Water Investigation

Report to:

PACIFIC WOOD TREATING
Ridgefield, Washington

Sweet, Edwards & Associates, Inc. • P.O. Box 328 • Kelso, WA 98626

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FIGURES

APPENDICES

SUMMARY AND RECOMMENDATIONS

The material of primary concern at the RBT pit is ash from the PWT boiler which historically admixed wastewater treatment plant sludges with hog fuel. Only one fraction of that ash, i.e., the fly ash, failed to pass D.O.E. EP toxicity testing, and then only for arsenic.

A review of regional and local hydrogeological conditions as well as inventorying local beneficial uses of ground water has been carried out. Subsequent grab samples from the RBT pond, five adjacent water wells and one background well more than a mile away shows no apparent contamination of the deep Troutdale aquifer.

Some surface water drains from the RBT pond during the wetter, winter, months. A thin unit of mica sand reportedly underlies the excavated pond above the Troutdale formation, and it may locally include a perched saturated zone. Any further water quality investigations at the site should focus on these two potential avenues for off-site migration of contaminants.

We recommend that PWT/RBT either:

1. Consider further testing for declassification of the waste, or

2. Proceed with a closeout plan for the RBT site.

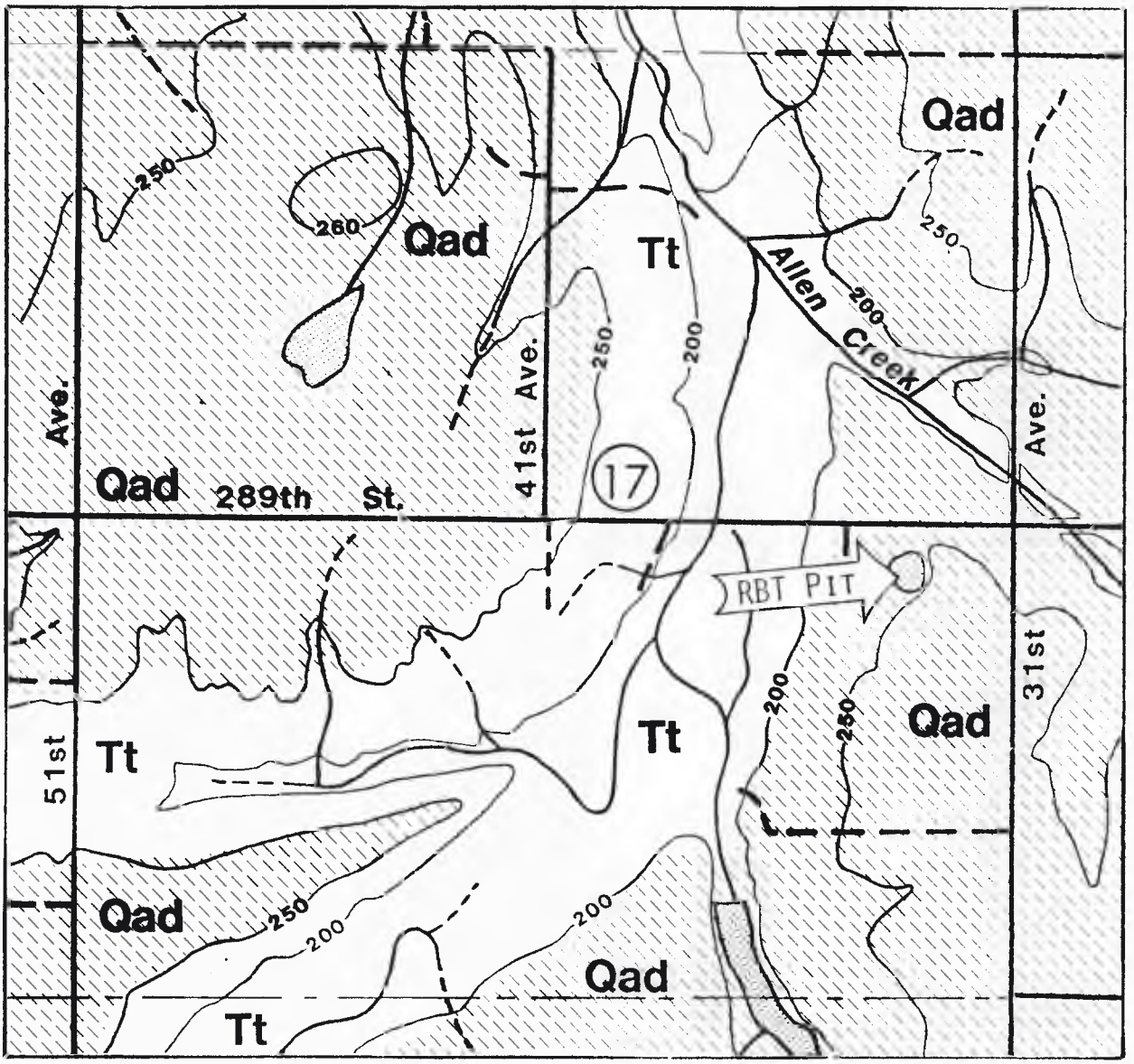
BACKGROUND

Since 1979 Pacific Wood Treating (PWT) has deposited about 4,700 cubic yards of material including log deck and yard clean up as well as ash at the Ridgefield Brick and Tile (RBT) clay pit. The pit is located on 289th Street, Ridgefield, Washington (NW 1/4, SE 1/4, Sec. 17T. 4 N./R. 1 E., W.M.), see Figure 1.

The ash included in the materials deposited at the RBT site is of greatest concern in this evaluation. It includes incinerated bottom sludge from PWT wastewater treatment facility which treats wastewater from the PWT wood preserving process. Klinker, multicone and bag house ash is mixed somewhat homogeneously throughout the filled portion of the clay pit.

HYDROGEOLOGY

The regional geology of Clark County has been described by Mundorff (1964). The upland areas near the RBT site are reportedly underlain by Quarternary alluvial deposits including deltaic gravels, sands and silts. Underlying this unit is Tertiary Troutdale formation which is effectively ubiquitous to Clark County. The upper member of the Troutdale generally includes cemented sand and gravel while the lower member is predominately finer grained silts and clays. Mundorff (1964) maps the Troutdale as cropping out in the canyon west of the RBT pit as well as Allen Canyon to the north and northwest.



Geologic contacts based on: USGS W.S.P. 1600, Plate 2

N

Scale: 1"=1000'

EXPLANATION

Qad — ALLUVIAL DEPOSITS- DELTAIC SAND AND GRAVEL, FINE SAND, AND SILT

Tt — TROUTDALE FORMATION- UPPER MEMBER, SAND AND GRAVEL; LOWER MEMBER, SILT AND CLAY

Note: See Figure 3 for additional Explanation.

RBT PIT
Geologic Map

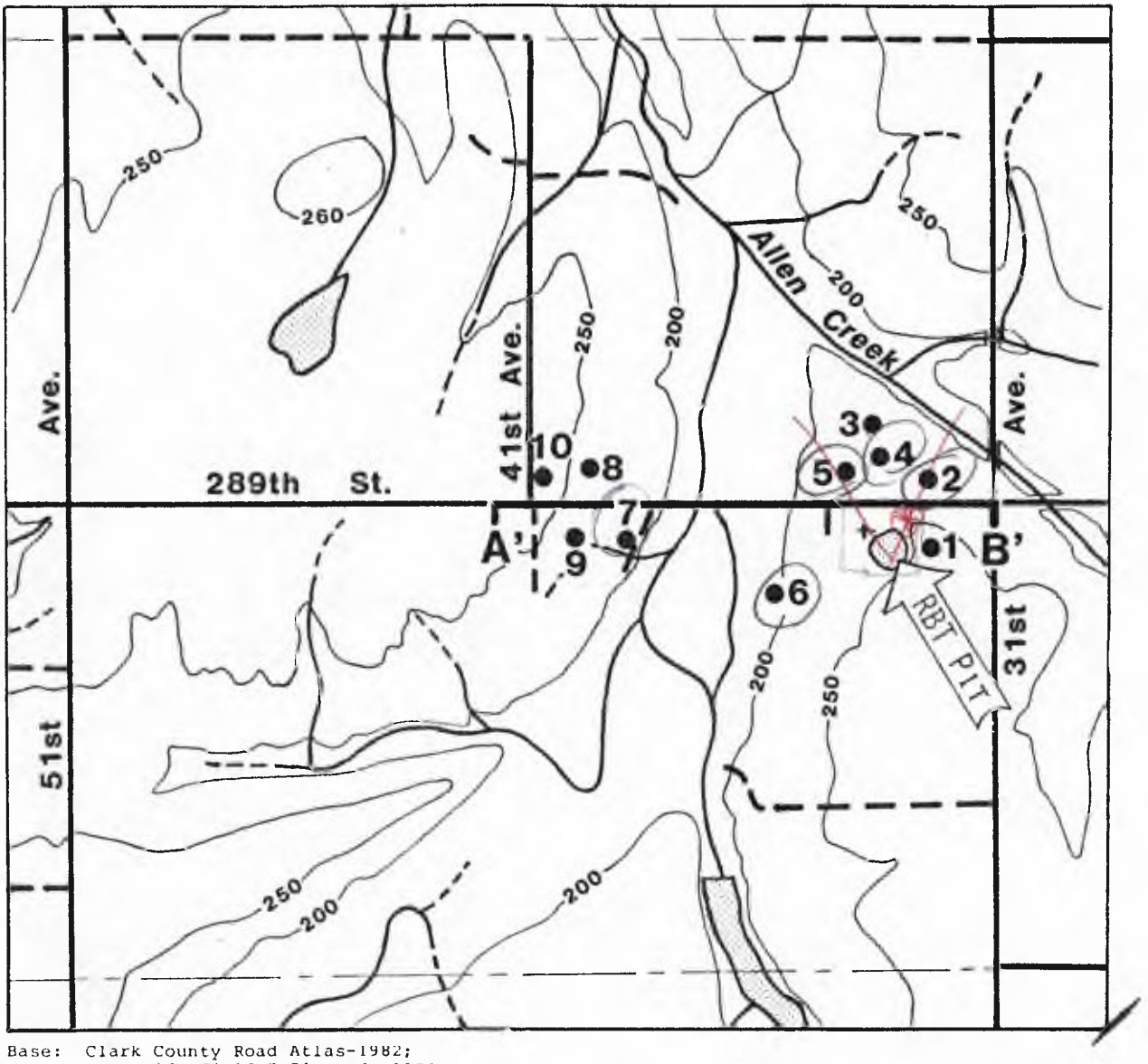
FIGURE 2

Sweet, Edwards & Associates, Inc.

Discussions with Elmer Muffett, RBT owner, indicated that the pit was excavated through up to 30 feet of clay (bottom elev. ≈ 200 feet) before encountering 3 to 4 feet of mica sand. His local experience at the site showed the mica sand unit to be underlain by cemented gravel. This appears to be consistent with the Mundorff (1964) interpretation in that the cemented gravel is considered to be the part of the Troutdale formation, see Figure 2 and 4 as well as appended well logs.

A records search and field location of wells in the immediate vicinity of the RBT pit provides a more detailed picture of the local geology. Figure 3 shows the RBT pit as well as field located wells. Well logs, locater sheets and published data from Mundorff (1964) is appended. Figure 4 shows an east-west cross section paralleling 289th Street. Well logs indicate that the water producing zones of the aquifer are sand in this area. The elevation of these zones is about 10 to 50 feet MSL.

The irregular surface of the Troutdale, shown on Figure 4 indicates that the deltaic unit unconformably overlies the Troutdale. The weathered surface of the Troutdale may result in locally perched ground water. This is supported by reports of sporadic success in obtaining small quantities of water from shallow dug wells. The ponding in the RBT pit also supports this interpretation. However, no productive shallow wells were located in the immediate area of the site.



Base: Clark County Road Atlas-1982; USGS-Ridgefield 7.5' Quad.-1970; Clark County Aerial Photo-1978; and field data.

N

Scale; 1"=1000'

EXPLANATION

- ●1 WELL LOCATION
- 200 TOPOGRAPHIC CONTOURS (FT. ABOVE MSL)
- ROADS
- SURFACE WATER
- A' B' LOCATION SECTION A'-B'

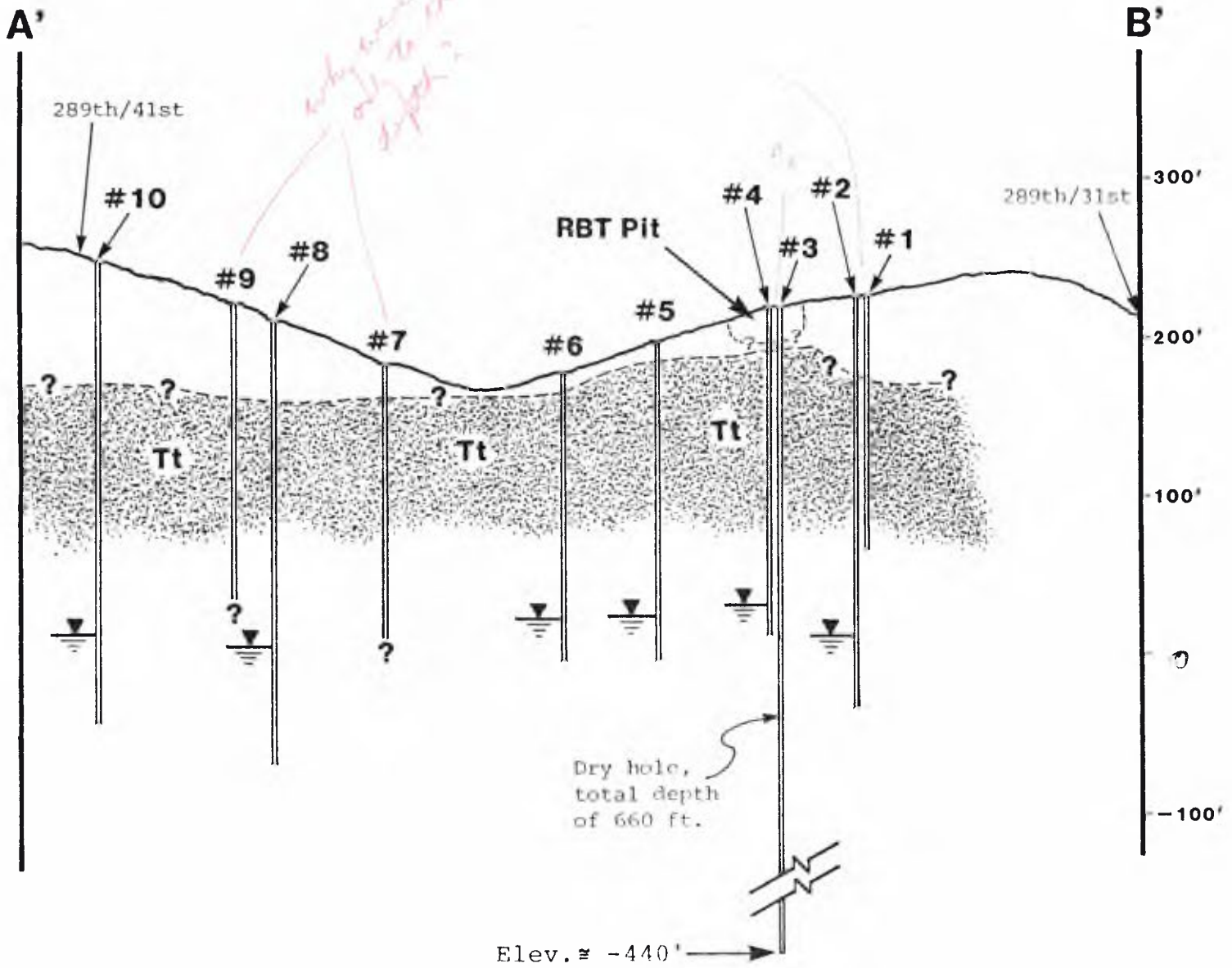
Note: See Figure 4 and appendix well data.

RBT PIT

Topographic Map and Local Water Wells

FIGURE 3

Sweet, Edwards & Associates, Inc.



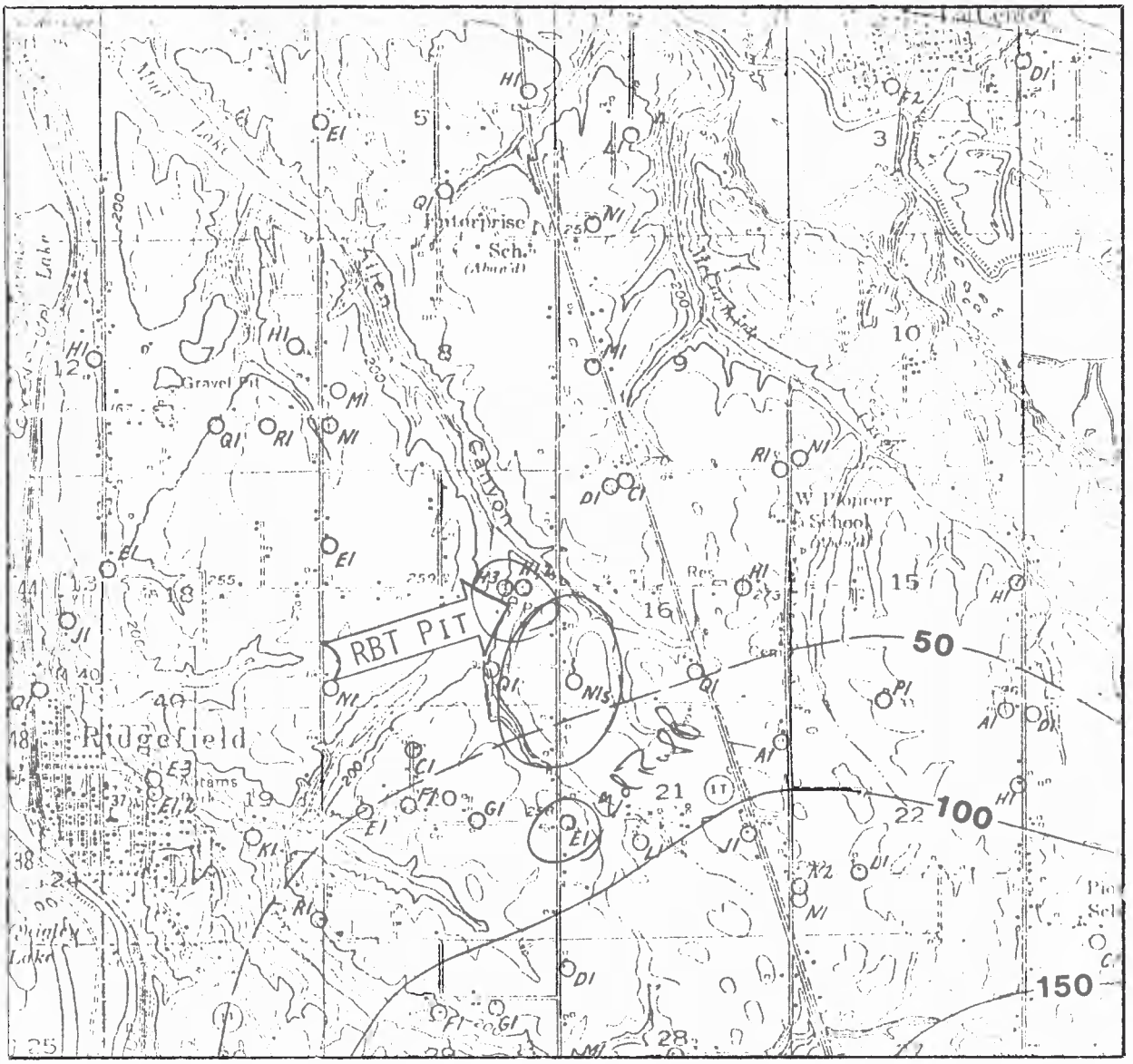
SCALE: HORIZONTAL @ 1"= 400'
VERTICAL @ 1"= 100'

PROJECTED WELL LOCATIONS,
DEPTHS AND REPORTED
STATIC WATER LEVELS
ALONG 289TH STREET,
RIDGEFIELD, WASH.

RBT PIT
Cross Section

FIGURE 4

Sweet, Edwards & Associates, Inc.



Base: USGS W.S.P. 1600, Plate 3

Scale: 1"=4000'

N

EXPLANATION

O_{EI} REPRESENTATIVE WELL

100 PRINCIPAL GROUND WATER CONTOUR

50 INTERMEDIATE GROUND WATER CONTOUR

RBT PIT

Ground Water Contour and Well Location Map

FIGURE 5

Sweet, Edwards & Associates, Inc.

Water Supply Paper 1600 has shown the general direction of ground water flow in the Troutdale aquifer to be from the southeast toward the northwest, see Figure 5. The aquifer has relatively high transmissive capabilities ranging from estimates of 800 to 6,000 gal/day/ft in the vicinity of the site. Assuming an effective thickness of 24 to 42 feet and a specific yield of 20 percent, the local pore or seepage velocity of underflow is calculated to range from about 0.2 to 1.6 ft/day from the southeast toward the northwest.

The local beneficial use of the aquifer is limited to domestic and agricultural supplies to wells. Wells located immediately downgradient are shown on Figure 3.

From Figure 4, it is obvious that the aquifer does not provide base flow to the intermittent perched stream which is located west of the RBT pit. However, it should be noted that some runoff and/or overflow drainage from the RBT site and pond periodically discharge to the 289th Street ditch and subsequently the intermittent drainage during the wetter, winter, months.

WATER QUALITY

Ambient quality in the Troutdale aquifer is generally good with regard to the Primary Drinking Water Standards (U.S.E.P.A., 1976) and as summarized by Mundorff (1964). Some Secondary constituents, most notably iron, locally approach or exceed recommended levels

for drinking water. For example, the owner of well No. 6 complained of iron in the well water and well No. 7 had noticable iron precipitation around the casing and plumbing fixtures.

As previously noted, the waste constituent of major concern in this evaluation is the ash from the PWT power boiler. Sludges containing copper, chrome and arsenic (CCA) residuals from the inorganic treating process wastewaters are admixed with hog fuel and incinerated in the boiler.

Department of Ecology (DOE) sampling and laboratory testing of the ash sources was carried out in 1982 and fully reported to PWT in September, 1982, see appended data. That test showed the presence of all of the heavy metals tested, except silver, beryllium and mercury. They were reportedly present in the various ash fractions in minor amounts. EP toxicity tests, i.e. eluting metals from the ash with a pH 5 solution, resulted in many of the remaining metals exceeding Primary Drinking Water Standards, see appended data. However, only arsenic exceeded EP toxicity limits in any ash fraction, see appended data.

Field sampling of the ponded water adjacent to the materials deposited at RBT as well as 5 nearby wells was carried out May 31, 1983. The pond water sample was taken at the face of the fill. It is noteworthy that fish, tadpoles and frogs were observed in the pond during that sampling. Well samples were collected at spigots closest to the well head but in most cases, i.e. all except well No. 6, sample residence time in water lines and/or pressure tanks could not be avoided. The sampling is not in strict compliance with Sweet-Edwards QA/QC procedures but does provide an indicator of

potential health hazards to the water users. Results of the tests run by PWT at their Ridgefield laboratory are included in Table 1.

Note that arsenic, chromium and copper levels are well below the DOE ash testing results at all sites. The pond would be most likely to exhibit some metals due to the reducing environment resulting from the generation of weak organic acids as the wood waste in the deck cleanup decomposes. The pond did have the only arsenic and pentachlorophenol (PCP) concentrations above the detection limit. However, the arsenic level is well below the Primary Drinking Water Standard of 50 µg/l. The pond water sample exceeded PCP reported acute toxicity (i.e. freshwater aquatic) limits of 55 µg/l but is well below the reported human health water consumption limit of 1010 µg/l (U.S.E.P.A., 1981). Well No. 2 also exceeded the detection limit, but was well below the human health water consumption limit. Multiple samples would be necessary to check these concentrations for significance.

Two well samples, Nos. 4 and background, exceed the Primary Drinking Water Standard of 50 µg/l for chromium. Given the location of the wells and the lack of other "high" levels of waste material constituents, these are considered to be artifacts of the plumbing system or lab variance. Similarly, the copper concentration noted for well No. 7 was above the testing detection limit, but below the Secondary Drinking Water Standard of 100 µg/l. This well is some distance from the spigot sampled at the house and copper plumbing in this newer home may be the source of the contamination.

TABLE 1

RBT SITE WATER TESTING DATA (5/31/83)

Bottle No.	Well or Site	Temp. °F(2)	pH	Constituent: Cu mg/l	Cr mg/l	As mg/l	Fe mg/l	Total Phenol. mg/l	PCP mg/l	SO_4 mg/l	TDS mg/l	E.C. µ mho/cm
(4)	No. 2	54	7.51	< .03	<.06	< .01	.17	< 0.1	0.100	< 80	152	210
(5)	No. 4	56	7.04	< .03	0.08	< .01	.12	< 0.1	<0.1	< 80	76	240
(2)	No. 5	52	7.20	< .03	<.06	< .01	.30	< 0.1	<0.1	< 80	172	260
(1)	No. 6	50	7.05	< .03	<.06	< .01	.14	< 0.1	<0.1	< 80	143	270
(6)	No. 7	56	7.20	0.08	<.06	< .01	.17	< 0.1	<0.1	< 80	88	190
(3)	Pond	58	7.24	< .03	<.06	0.017	.24	< 0.1	0.134	< 80	162	300
(7)	Backgrd. (Ryf) 23ft deep		7.04	< .03	0.10	< .01	.16	< 0.1	<0.1	< 80	122	200

NOTES: 1) Grab samples collected by Sweet-Edwards 5/31/83 and tested by PWT.

2) Temperatures at all sites except No. 2 and pond may be biased by pressure tank and/or pipe line residence time.

Note the pH level in the pond may be buffered or raised by the ash and it does not approach the level used for the EP toxicity testing. Other factors may retard the mobility of metals from the deposited materials. Silts, clays, gravel, etc., materials commonly make up 50 to 60 percent of the materials in log deck cleanup. These have some capacity to adsorb metals. Some carbon is included with the ash, and although not activated, it too has some sorptive capacity and may reduce mobility.

Finally, lateral migration from the site will be significantly retarded by the low hydraulic conductivity or permeability as well as the cation exchange capacity of the native clays surrounding the site. Similarly fine materials, silt and clay, in the unsaturated portion of the Troutdale formation provide for adsorption of vertically percolating liquids. This in combination with dispersion, dilution, etc., apparently provides protection to the aquifer.

REFERENCES

MUNDORFF, M. J. 1964, Geology and Ground Water Conditions of Clark County Washington, with a Description of a Major Alluvial Aquifer Along the Columbia River, U.S. Geological Survey Water Supply Paper 1600, 268 p. plus 3 plates.

U.S. ENVIRONMENTAL PROTECTION AGENCY, 1976, National Interim Primary Drinking Water Regulations, Federal Register, Vol. 41, No. 133.

U.S. ENVIRONMENTAL PROTECTION AGENCY, 1981, Out:1 Chemical Criteria Summary Listing, Surveillance and Analysis Division, Region X, Seattle, Washington.

No. 1

SWEET, EDWARDS & ASSOCIATES, INC.
WELL DATA

Project Pacific Wood

Owner (b) (6)
Address
Tenant
Address

State No. 4N/1E-17 add
Other No.

Type of Well: Hydrograph ☐ Key ☐ Index ☑ Semiannual ☐ Quality ☐

Location: County Basin No.

U.S.G.S. Quad. Quad. No.

SE ¼ NE ¼ Section 17, Twp. 4N, Rge. 1E Will. Meridian

Description Unable to locate log or contact owner

Reference Point description

which is ft. above/below land surface. Ground Elevation 230 ft. ft.

Reference Point Elev. ft. Determined from

Well: Use Condition Depth ft.

Casing, size in., perforations

Measurements By: DWR ☐ USGS ☐ USBR ☐ County ☐ Irr. Dist. ☐ Water Dist. ☐ Cons. Dist. ☐ Other ☐

Chief Aquifer: Name Depth to Top Aq. Depth to Bot. Aq.

Type of Material Perm. Rating Thickness

Gravel Packed? Yes ☐ No ☐ Depth to Top Gr. Depth to Bot. Gr.

Supp. Aquifer Depth to Top Aq. Depth to Bot. Aq.

Driller No log on file

Date drilled Log, filed open (1) confidential (2)

Equipment: Pump, type make

Serial No. Size of discharge pipe in.

Power, Kind Make

H. P. Motor Serial No.

Elec. Meter No. Transformer No.

Yield G.P.M. Pumping level ft.

Water Analysis: Min. (1) San. (2) H.M. (3)

Water Levels available: Yes (1) No

Period of Record: Begin End

Collecting Agency:

Prod. Rec. (1) Pump Test (2) Yield (3)

SKETCH

(b) (6)

N

REMARKS

Not measured or sampled

Recorded by: HRS

Date 5/27/83

No. 2

SWEET, EDWARDS & ASSOCIATES, INC.
WELL DATA

Project Pacific Wood

Owner (b) (6)
Address [redacted] Ground, WN 98604
Tenant
Address

State No. 4N/1E - 17 d2 b
Other No.

Type of Well: Hydrograph ☑ Key ☐ Index ☐ Semiannual ☐ Quality ☑
Location: County Clark Basin No.
U.S.G.S. Quad. Ridgefield Quad. No.
NE ¼ SE ¼ Section 17, Twp. 4N, Rge. 1E Will. Meridian
Description

Reference Point description

which is 1 ft. above ~~below~~ land surface. Ground Elevation 203 ft. ft.
Reference Point Elev. ft. Determined from
Well: Use Domestic Condition Good Depth 260 ft.
Casing, size 6 in., perforations

Measurements By: DWR ☐ USGS ☐ USBR ☐ County ☐ Irr. Dist. ☐ Water Dist. ☐ Cons. Dist. ☐ Other ☑
Chief Aquifer: Name SEE LOG Depth to Top Aq. Depth to Bot. Aq.
Type of Material Perm. Rating Thickness
Gravel Packed? Yes ☐ No ☐ Depth to Top Gr. Depth to Bot. Gr.
Supp. Aquifer Depth to Top Aq. Depth to Bot. Aq.
Driller SEE LOG
Date drilled Log filed open (1) confidential (2)
Equipment: Pump, type Submersible make
Serial No. Size of discharge pipe in.
Power, Kind Make
H. P. Motor Serial No.
Elec. Meter No. Transformer No.
Yield G.P.M. Pumping level ft.

Water Analysis: Min. (1) San. (2) H.M. (3)
Water Levels available: Yes (1) No
Period of Record: Begin End
Collecting Agency:
Prod. Rec. (1) Pump Test (2) Yield (3)

SKETCH

N

(b) (6) [redacted]

REMARKS

Well located south of tree which is east of house in concrete ring.

Sampling from nearest spigot located behind garage to the west of house.

Recorded by: HRS
Date 6/11/83

Second Copy — Owner's Copy
rd Copy — Driller's Copy

STATE OF WASHINGTON

Permit No. ....

(1) OWNER: Name (b) (6) Address

(2) LOCATION OF WELL: County Clark — ¼ ¼ Sec. 17 T. 4 N., R. 1E W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☒ Industrial ☐ Municipal ☐ Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one)....

New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☒ Driven ☐
Reconditioned ☐ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches. Drilled 260 ft. Depth of completed well 260 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6 " Diam. from 0 ft. to 248 ft.
Threaded ☐ 5ID " Diam. from 253 ft. to 260 ft.
Welded ☒ " Diam. from ft. to ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☒ No ☐
Manufacturer's Name UOP Johnson
Type stainless/steel Model No.
Diam. 6" Slot size 15 from 248 ft. to 253 ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 20 ft.
Material used in seal clay & Bentonite
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level.... ft.
Static level 215 ft. below top of well Date 5-30-72
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test 20 gal./min. with 7 ft. drawdown after 1 hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
dug well	0	5
brown clay	5	12
sandy brown clay	12	49
cemented sand & gravel	49	72
hard cemented gravel	72	137
light brown sandy clay	137	159
brown dry sand	159	205
brown sand few gravel	205	218
loose brown sand & water	218	252
fine sand & water	252	260

Work started 5-19, 1972 Completed 5-30, 1972

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Hansen Drilling Co., Inc.
(Person, firm, or corporation) (Type or print)

Address 6711 N.E. 58th Ave. Vancouver Wa.

[Signed] Mussett Johnson
(Well Driller) KM Hansen

License No. 223-02-1155 Date June 1, 1972

(USE ADDITIONAL SHEETS IF NECESSARY)

F. No. 7356—OS—(Rev. 4-71).

No. 3, 4, 5

SWEET, EDWARDS & ASSOCIATES, INC.
WELL DATA

Project Pacific Wood

Owner (b) (6)
Address
Tenant
Address

State No. 4N/1E-17ad
Other No.

Type of Well: Hydrograph ☑ Key ☐ Index ☑ Semiannual ☐ Quality ☐

Location: County Clark Basin No.

U.S.G.S. Quad. Ridgefield Quad. No.

SE ¼ NW ¼ Section 17, Twp. 4N, Rge. 1E Will. Meridian

Description well logs from USGS, Water Supply Paper 1600 attached.

Reference Point description

which is 0.5 ft. above below land surface. Ground Elevation #3 & 4 = 225 ft #5 = 200 ft ft.

Reference Point Elev. ft. Determined from Quad sheet

Well: Use domestic Condition Depth ft.

Casing, size 6 in in., perforations

Measurements By: DWR ☐ USGS ☐ USBR ☐ County ☐ Irr. Dist. ☐ Water Dist. ☐ Cons. Dist. ☐ Other ☐

Chief Aquifer: Name Troutdale Depth to Top Aq. see logs Depth to Bot. Aq.

Type of Material Perm. Rating Thickness

Gravel Packed? Yes ☐ No ☐ Depth to Top Gr. Depth to Bot. Gr.

Supp. Aquifer Depth to Top Aq. Depth to Bot. Aq.

Driller R.J. Strasser for #4 & #5

Date drilled Log, filed open (1) confidential (2)

Equipment: Pump, type make

Serial No. Size of discharge pipe in.

Power, Kind Make

H. P. Motor Serial No.

Elec. Meter No. Transformer No.

Yield G.P.M. Pumping level ft.

Water Analysis: Min. (1) San. (2) H.M. (3)

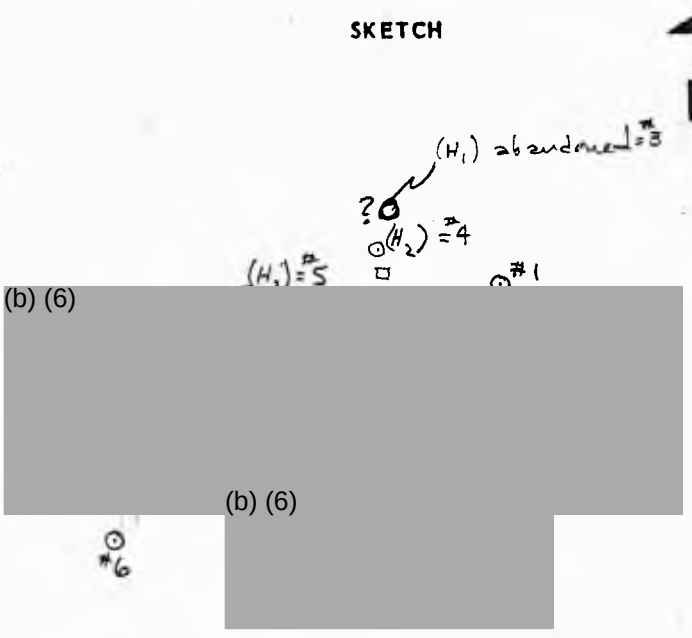
Water Levels available: Yes (1) No

Period of Record: Begin End

Collecting Agency:

Prod. Rec. (1) Pump Test (2) Yield (3)

SKETCH



REMARKS

#3 abandoned

#4 spigot at shed south of pump house.

#5 spigot at west end of pump house

Recorded by: ARS

Date 5/31/83

TABLE 17.—*Materials penetrated by representative wells*—Continued

Materials	Thickness (feet)	Depth (feet)	Materials	Thickness (feet)	Depth (feet)

4/1-16D1

[H. Weston. West Pioneer. At intersection of U.S. Highway 99 and County Road 28. Altitude about 265 ft. Drilled by R. J. Strasser. Casing, 6-in. to 277 ft; perforated and gravel-packed from 256 to 270 ft]

Pleistocene alluvial deposits:			Troutdale formation—Con.		
Clay, yellow, and topsoil	85	85	Upper member—Con.		
Troutdale formation:			Gravel, loose, dry	35	215
Upper member:			Lower member:	41	256
Gravel, cemented	53	138	Sand, dry	14	270
Sand	3	141	Sand, water-bearing	7	277
Gravel, cemented	39	180	Sand, dry, hard		

4/1-17H1

[C. B. Moffett. About 2 miles northeast of Ridgefield and 0.1 mile west of intersection of County Roads 21 and 25. Altitude about 225 ft. Drilled by R. A. Jobes. Casing, 6-in. to 450 ft, 5-in. to 660 ft]

Troutdale formation:			Troutdale formation—Con.		
Upper member:			Lower member:		
Clay	30	30	Sand, coarse, yellow	80	210
Gravel, cemented	100	130	Sand (quicksand), fine	450	660

4/1-17H2

[C. B. Moffett. About 2 miles northeast of Ridgefield and 0.1 mile west of intersection of County Roads 21 and 25. Altitude about 225 ft. Drilled by R. J. Strasser. Casing, 6-in. to 209 ft]

Troutdale formation:			Troutdale formation—Con.		
Upper member:			Lower member:		
Topsoil	2	2	Clay, blue and yellow	83	190
Clay, yellow	26	28	Sand, water-bearing	19	209
Conglomerate	79	107			

4/1-17H3

[C. B. Moffett. About 2 miles northeast of Ridgefield and 0.3 mile west of intersection of County Roads 21 and 25. Altitude about 200 ft. Drilled by R. J. Strasser. Casing, 12-in. to 200 ft]

Troutdale formation:			Troutdale formation—Con.		
Upper member:			Upper member—Con.		
Topsoil	2	2	Conglomerate	75	87
Clay, yellow	10	12	Lower member:	86	173
			Clay, blue and yellow	27	200
			Sand, water bearing		

4/1-19E3

[Town of Ridgefield. Altitude about 35 ft. Drilled by R. J. Strasser, 1955. Casing, 10-in. to 65 ft; perforated]

Recent alluvium:			Troutdale formation—Con.		
Surface topsoil	6	6	Gravel, cemented	8	50
Boulders	4	10	Sand, and gravel, water-bearing	6	56
Troutdale formation:			Gravel, cemented	9	65
Gravel, cemented	26	36			
Gravel, water-bearing	6	42			

4/1-19R1

[A. F. Frewing. About 1.1 miles southeast of Ridgefield. Altitude about 240 ft. Drilled by Hansen Drilling Co., 1955. Casing, 6-in. to 150 ft]

Pleistocene alluvial deposits:			Troutdale formation:		
Topsoil	3	3	Gravel, cemented	65	145
Clay and sand	14	17	Gravel and sand, water-bearing	5	150
Clay, blue	8	25			
Clay, yellow	55	80			

TABLE 15.—*Records of representative wells in Clark County, Wash.*—Continued

Well	Owner or tenant	Topography	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Depth of casing (feet)	Water-bearing zone: Depth to top (feet)	Water-bearing zone: Thickness (feet)	Water-bearing zone: Character of material	Water level: Depth	Water level: Date	Pump: Type	Pump: H.P.	Use	Remarks
T. 4 N., R. 1 E.—Con.																
15H1	T. Richards	Up	280	Dg	21	30				Sand	13.3	9- 9-49	J	½	D	
15P1	G. G. Pittman	Up	285	Dr	360	6				do	230		P	2	D	
16C1	A. W. Sundvick	Up	272	Dr	274	6	274	258	14	do	250		P	1½	D	Cp. L.
16D1	H. Weston	Up	265	Dr	277	6	277	256	14	do	250		P	¾	D	L.
16H1	S. D. Zimmerly	Up	280	Dr	630	6-3	630			do	190		P		D	Cp.
16Q1	E. Hardt	Up	270	Dg	30	48				do	12		C	½	D	
17E1	M. Starkey	Up	260	Dg	17					Gravel	15.6	9- 9-49	P	¼	D	
17H1	C. B. Moffett	S	225	Dr	660	6-5	660						N		NU	No water reported. L.
17H2	do	S	225	Dr	209	6	209	190	19	Sand	194		P		D	Pumped 30 gpm. L.
17H3	do	S	200	Dr	200	12-6	200	173	27	do	173		P	5	D	Pumped 30 gpm. Cp. L.
17N1	D. G. Lane	Up	265	Dg	11	36-60				do	1.8	5-11-49	C	½	D	
17Q1	Paul and Marion Bellows.	S	210	Dr	300	6	300	190	170	Sand, fine	174	May 1953	T	10	D, Irr	Pumped 4 hrs at 53 gpm, 141-ft dd.
18E1	O. J. Shirley	S	135	Dg	40					Gravel, cemented.	33.5	9- 9-49	J	½	D	
19E1	Town of Ridgefield.	S	40	Dg	35	120	34	8	27	Gravel, coarse	22		T	20	PS	Pumped 4 hrs at 250 gpm, 11-ft dd. Water temp 51°. Cp.
19E2	do	S	35	Dg	35	120	35	14		Gravel			C	45	PS	Pumped 12 hrs at 250 gpm, 6-ft dd.
19E3	do	S	35	Dr	65	10	65	50	6	do	38	May 1955			PS	Pumped 150 gpm, 16-ft dd. L.
19K1	G. Benedict	S	55	Dr	117	6				do	52		J	½	D	Cp.
19R1	A. F. Frewing	S	240	Dr	150	6	150	145	5	Gravel and sand.	122	September 1955			D	Pumped 36 gpm, 6-ft dd. L.
20C1	Pearl Talbert	Up	260	Dr	343	6	343	310	25	Sand	229		T		Irr	Pumped 60 gpm, 78-ft dd. L.
20E1	E. R. Northup	Up	220	Dg	32	48				do	21		C	¼	D	Cp.
20F1	C. Bramlett	Up	248	Dg	9	36				Gravel	5.9	5-11-49	C	½	D	
20G1	John Ryf	Up	260	Dr	227	6	227			Gravel, cemented.			P	1½	D	Pumped 10 gpm. L.
21A1	A. Kapus	Up	272	Dr	196	6				Sand	189		P	1	D	
21E1	F. Forsberg	Up	258	Dr	119	6				Gravel	110		P	1	D	
21J1	C. Greeley	Up	283	Dr	210	6				Sand	180		P	3	D, S	
21L1	H. Lahti	Up	255	Dr	202	6				Gravel	174		P	1	D	Cp.
22A1	Jules Kercheart	Up	280	Dr	601	8	601						T	5	D, S	
22H1	F. Schweizer	Up	290	Dr	571	4				Sand	250		T	5	D, S	Used for dairy. Cp.
22L1	J. Glarum	Up	280	Dg	18	48				do	14		C	¼	D	
22N1	D. Hallowell	Up	270	Dr	185	6		100		Gravel	158					Cemented gravel from 85 to 185 ft. Pumped 1 hr at 30 gpm, 12-ft dd.
22N2	J. Timms	Up	275	Dr	174	6	174	169	5	Sand and gravel.	155					Bailer test, 4-ft dd. L.

No. 6

SWEET, EDWARDS & ASSOCIATES, INC.
WELL DATA

Project Pacific Wood

Owner (b) (6)
Address
Tenant Same
Address same

State No. 4/1E - 17 dab
Other No.

Type of Well: Hydrograph ☐ Key ☐ Index ☐ Semiannual ☐ Quality ☑

Location: County Clark Basin Lewis No.
U.S.G.S. Quad. Ridgefield Quad. No.
NE ¼ SE ¼ Section 17, Twp. 4N, Rge. 1E Will. Meridian

Description

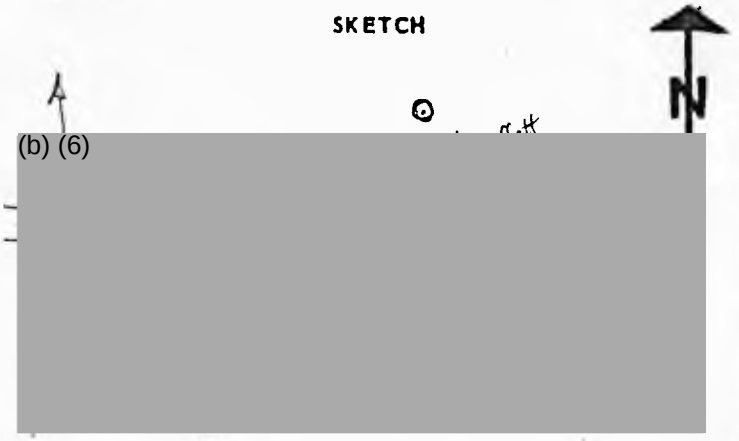
Reference Point description Top of casing

which is 1 ft. above below land surface. Ground Elevation 180 ft m.s.l. ft.
Reference Point Elev. ft. Determined from
Well: Use domestic Condition good Depth ft.
Casing, size in., perforations

Measurements By: DWR ☐ USGS ☐ USBR ☐ County ☐ Irr. Dist. ☐ Water Dist. ☐ Cons. Dist. ☐ Other ☑
Chief Aquifer: Name SEE LOG Depth to Top Aq. Depth to Bot. Aq.
Type of Material Perm. Rating Thickness
Gravel Packed? Yes ☐ No ☐ Depth to Top Gr. Depth to Bot. Gr.
Supp. Aquifer Depth to Top Aq. Depth to Bot. Aq.
Driller
Date drilled Log, filed open (1) confidential (2)
Equipment: Pump, type Submersible make
Serial No. Size of discharge pipe in.
Power, Kind Make
H. P. Motor Serial No.
Elec. Meter No. Transformer No.
Yield G.P.M. Pumping level ft.

Water Analysis: Min. (1) San. (2) H.M. (3)
Water Levels available: Yes (1) No
Period of Record: Begin End
Collecting Agency:
Prod. Rec. (1) Pump Test (2) Yield (3)

SKETCH



REMARKS

well set in concrete ring w/

(b) (6)

Recorded by: HRS
Date 5/27/83

e Original and First Copy with
partment of Ecology
cond Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Application No. .....

Permit No. .....

1) OWNER: Name (b) (6) Ridgefield

(2) LOCATION OF WELL: County Clark NE¼-NW¼SE¼ Sec. 17 T. 4 N., R. 1E W.M.

Bearing and distance from section or subdivision corner

3) PROPOSED USE: Domestic ☑ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

4) TYPE OF WORK: Owner's number of well (if more than one) .....
New well ☑ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☑ Jetted ☐

5) DIMENSIONS: Diameter of well 6 inches.
Drilled 180 ft. Depth of completed well 179 ft.

6) CONSTRUCTION DETAILS:
Casing installed: 6 " Diam. from 0 ft. to 173½ ft.
Threaded ☐ 5½ " Diam. from 171 ft. to 174 ft.
Welded ☑ ..... " Diam. from ..... ft. to ..... ft.

Perforations: Yes ☐ No ☑
Type of perforator used .....
SIZE of perforations ..... in. by ..... in.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

Screens: Yes ☑ No ☐
Manufacturer's Name Johnson
Type Stainless Steel Model No. .....
Diam. 6 Slot size 18 from 174 ft. to 179 ft.
Diam. ..... Slot size ..... from ..... ft. to ..... ft.

Gravel packed: Yes ☐ No ☑ Size of gravel: .....
Gravel placed from ..... ft. to ..... ft.

Surface seal: Yes ☑ No ☐ To what depth? 18 ft.
Material used in seal Bentonite
Did any strata contain unusable water? Yes ☐ No ☑
Type of water? ..... Depth of strata .....
Method of sealing strata off .....

(7) PUMP: Manufacturer's Name .....
Type: ..... H.P. .....

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ft.
Static level 156 ft. below top of well Date 7/23/82
Artesian pressure ..... lbs. per square inch Date .....
Artesian water is controlled by ..... (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☑ If yes, by whom? .....
Yield: ..... gal./min. with ..... ft. drawdown after ..... hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test .....
Bailer test 11 gal./min. with 4 ft. drawdown after 1 hrs.
Artesian flow ..... g.p.m. Date .....
Temperature of water ..... Was a chemical analysis made? Yes ☑ No ☐
Iron - 5ppm
Hardness 7gpg

(10) WELL LOG:

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Topsoil	0	1
Gravel & cobbles with brown clay	1	15
Gravel, partially cemented	15	77
Clay, tan	77	108
Sand, brown, cemented	108	112
Sand, tan	112	126
Sand, brown	126	140
Sand, brown, coarse with gravel, brown & black cemented	140	156
Sand, brown	156	173
Sand, brown, coarse water bearing	173	180

RECEIVED
AUG 9 1982
DEPARTMENT OF ECOLOGY
SOUTHWEST REGIONAL OFFICE

Work started 7/22 1982 Completed 7/23 1982

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME RITOLA WELL DRILLING
(Person, firm, or corporation) (Type or print)
14214 N.E. 202nd Ave. - Ph. 892-4754
Address Brush Prairie, Wash. 98606

[Signed] David Ritola
(Well Driller)

License No. 423 Date 7/23, 1982

(USE ADDITIONAL SHEETS IF NECESSARY)

No. 7

SWEET, EDWARDS & ASSOCIATES, INC.
WELL DATA

Project Pacific Wood

Owner (b) (6)
Address Ridgefield, WA
Tenant same
Address

State No. 4N/1E-17 dba
Other No.

Type of Well: Hydrograph ☐ Key ☐ Index ☑ Semiannual ☐ Quality ☑

Location: County Clark Basin No.
U.S.G.S. Quad. Ridgefield Quad. No.
NW ¼ SE ¼ Section 17, Twp. 4N, Rge. 1E Will. Meridian

Description No log on file – recollected depth @ 274 or 294 ft.

Reference Point description

which is 1 ft. above ~~below~~ land surface. Ground Elevation 190 ft ft.
Reference Point Elev. ft. Determined from Quad
Well: Use domestic Condition (noticed iron precip.) Depth ft.
Casing, size 6 in., perforations

Measurements By: DWR ☐ USGS ☐ USBR ☐ County ☐ Irr. Dist. ☐ Water Dist. ☐ Cons. Dist. ☐ Other ☐
Chief Aquifer: Name Depth to Top Aq. Depth to Bot. Aq.
Type of Material Perm. Rating Thickness
Gravel Packed? Yes ☐ No ☐ Depth to Top Gr. Depth to Bot. Gr.
Supp. Aquifer Depth to Top Aq. Depth to Bot. Aq.
Driller
Date drilled Log, filed open (1) confidential (2)
Equipment: Pump, type submersible make
Serial No. Size of discharge pipe in.
Power, Kind Make
H. P. Motor Serial No.
Elec. Meter No. Transformer No.
Yield G.P.M. Pumping level ft.

Water Analysis: Min. (1) San. (2) H.M. (3)
Water Levels available: Yes (1) No
Period of Record: Begin End
Collecting Agency:
Prod. Rec. (1) Pump Test (2) Yield (3)

SKETCH

(b) (6)

N

REMARKS

Sample from sluice

(b) (6)

Recorded by:
Date

No. 8

SWEET, EDWARDS & ASSOCIATES, INC.
WELL DATA

Project Pacific Wood

Owner (b) (6)
Address
Tenant
Address

State No. 4N/1E - 17 acc
Other No.

Type of Well: Hydrograph ☑ Key ☐ Index ☐ Semiannual ☐ Quality ☐

Location: County _____ Basin _____ No. _____

U.S.G.S. Quad. _____ Quad. No. _____

SW ¼ NE ¼ Section 17, Twp. 1N, Rge. 4E Will. Meridian

Description McGhee reported 286 ft. deep w/ 1ft gravel and sand from 56-13 and swl @ 210 ft.

Reference Point description _____

which is 1 ft. above ~~below~~ land surface. Ground Elevation 215 ft. ft.

Reference Point Elev. _____ ft. Determined from _____

Well: Use domestic & farm Condition good Depth _____ ft.

Casing, size 6 in., perforations _____

Measurements By: DWR ☐ USGS ☐ USBR ☐ County ☐ Irr. Dist. ☐ Water Dist. ☐ Cons. Dist. ☐ Other ☑

Chief Aquifer: Name Troutdale Depth to Top Aq. _____ Depth to Bot. Aq. _____

Type of Material sand & gravel Perm. Rating _____ Thickness _____

Gravel Packed? Yes ☐ No ☐ Depth to Top Gr. 56 Depth to Bot. Gr. _____

Supp. Aquifer _____ Depth to Top Aq. _____ Depth to Bot. Aq. _____

Driller McGhee, Kelso, WN

Date drilled _____ Log, filed Can't find. open (1) _____ confidential (2) _____

Equipment: Pump, type Submersible make _____

Serial No. _____ Size of discharge pipe _____ in.

Power, Kind _____ Make _____

H. P. _____ Motor Serial No. _____

Elec. Meter No. _____ Transformer No. _____

Yield _____ G.P.M. Pumping level _____ ft.

Water Analysis: Min. (1) _____ San. (2) _____ H.M. (3) _____

Water Levels available: Yes (1) 210 ft. No _____

Period of Record: Begin _____ End _____

Collecting Agency: _____

Prod. Rec. (1) _____ Pump Test (2) _____ Yield (3) _____

SKETCH

(b) (6)

REMARKS

Well located

(b) (6)

(b) (6)

Recorded by: HKS

Date 6/1/83

No. 9

SWEET, EDWARDS & ASSOCIATES, INC.
WELL DATA

Project Pacific Wood

Owner (b) (6)
Address
Tenant same
Address

State No. 4/1E-17 ddb
Other No.

Type of Well: Hydrograph ☐ Key ☐ Index ☐ Semiannual ☐ Quality ☑

Location: County Clark Basin Lewis No.

U.S.G.S. Quad. Ridgefield Quad. No.

NW ¼ SE ¼ Section , Twp. 4N , Rge. 1E Will. Meridian

Description

Reference Point description

which is NA ft. above / below land surface. Ground Elevation 240 ft msl ft.

Reference Point Elev. ft. Determined from

Well: Use Condition Depth ft.

Casing, size in., perforations

Measurements By: DWR ☐ USGS ☐ USBR ☐ County ☐ Irr. Dist. ☐ Water Dist. ☐ Cons. Dist. ☐ Other ☐

Chief Aquifer: Name Depth to Top Aq. Depth to Bot. Aq.

Type of Material Perm. Rating Thickness

Gravel Packed? Yes ☐ No ☐ Depth to Top Gr. Depth to Bot. Gr.

Supp. Aquifer Depth to Top Aq. Depth to Bot. Aq.

Driller LOG NOT AVAILABLE

Date drilled Log, filed open (1) confidential (2)

Equipment: Pump, type make

Serial No. Size of discharge pipe in.

Power, Kind Make

H. P. Motor Serial No.

Elec. Meter No. Transformer No.

Yield G.P.M. Pumping level ft.

Water Analysis: Min. (1) San. (2) H.M. (3)

Water Levels available: Yes (1) No

Period of Record: Begin End

Collecting Agency:

Prod. Rec. (1) Pump Test (2) Yield (3)

SKETCH

(b) (6)

REMARKS

(b) (6)

Well in pump house

Recorded by:

Date

No. 10

SWEET, EDWARDS & ASSOCIATES, INC.
WELL DATA

Project Pacific Wood

Owner (b) (6)
Address Ridgefield
Tenant same
Address

State No. 4N/1E-17 cc 2
Other No.

Type of Well: Hydrograph ☑ Key ☐ Index ☐ Semiannual ☐ Quality ☐

Location: County Clark Basin No.
U.S.G.S. Quad. Ridgefield Quad. No.
SW ¼ NE ¼ Section 17, Twp. 4N, Rge. 1E Will. Meridian

Description

Reference Point description

which is 1 ft. above ~~below~~ land surface. Ground Elevation 255 ft. ft.
Reference Point Elev. ft. Determined from
Well: Use domestic Condition Depth ft.
Casing, size 6 in. in., perforations

Measurements By: DWR ☐ USGS ☐ USBR ☐ County ☐ Irr. Dist. ☐ Water Dist. ☐ Cons. Dist. ☐ Other ☑
Chief Aquifer: Name Depth to Top Aq. Depth to Bot. Aq.
Type of Material Perm. Rating Thickness
Gravel Packed? Yes ☐ No ☐ Depth to Top Gr. Depth to Bot. Gr.
Supp. Aquifer Depth to Top Aq. Depth to Bot. Aq.
Driller SEE LOG
Date drilled Log, filed open (1) confidential (2)
Equipment: Pump, type make
Serial No. Size of discharge pipe in.
Power, Kind Make
H. P. Motor Serial No.
Elec. Meter No. Transformer No.
Yield G.P.M. Pumping level ft.

Water Analysis: Min. (1) San. (2) H.M. (3)
Water Levels available: Yes (1) No
Period of Record: Begin End
Collecting Agency:
Prod. Rec. (1) Pump Test (2) Yield (3)

SKETCH

(b) (6)

N

REMARKS

(b) (6)

Recorded by: HRS
Date 6/1/83

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Application No. _____
Permit No. _____

(1) OWNER: Name (b) (6) Ridgefield, WA

(2) LOCATION OF WELL: County Clark — SW ¼ NE ¼ Sec. 12 T. 4 N., R. 1 W.M.
Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic [X] Industrial [ ] Municipal [ ]
Irrigation [ ] Test Well [ ] Other [ ]

(4) TYPE OF WORK: Owner's number of well (if more than one) ....
New well [X] Method: Dug [ ] Bored [ ]
Deepened [ ] Cable [X] Driven [ ]
Reconditioned [ ] Rotary [ ] Jetted [ ]

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 290 ft. Depth of completed well 290 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6 " Diam. from 0 ft. to 278 ft.
Threaded [ ] 5 " Diam. from 277 ft. to 279 ft.
Welded [X] 5 " Diam. from 284 ft. to 290 ft.

Perforations: Yes [ ] No [X]
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes [X] No [ ]
Manufacturer's Name Johnson
Type Stainless Steel Model No
Diam. 6 Slot size 15 from 279 ft. to 284 ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes [ ] No [X] Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes [X] No [ ] To what depth? 25 ft.
Material used in seal Bentonite & drill cuttings
Did any strata contain unusable water? Yes [ ] No [X]
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level.... ft.
Static level 238 ft. below top of well Date 7-21-75
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes [ ] No [X] If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test 7-22
Bailer test 12 gal./min. with 270 ft. drawdown after 1 hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes [ ] No [X]

(10) WELL LOG:

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Brown clay soil	0	2
Light brown clay	2	25
Light brown silty clay	25	35
Brown silty sand	35	51
Fine brown sand & occassional gravel	51	57
Fine brown sand	57	76
Cemented gravel	76	95
Loose gravel	95	139
Dry brown sand	139	191
Brown silty clay	191	196
Dry grey-brown sand	196	245
Red-brown sandy clay & fine gravel	245	251
Dark brown partially cemented sand, gravel & water	251	256
Light brown sand & water	256	285
Brown sandy clay	285	290

Work started 7-9, 19 75 Completed 7-21, 19 75

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Hansen Drilling Co., Inc.
(Person, firm, or corporation) (Type or print)

Address 6711 NE 58th Ave., Vancouver, WA. 0546 Carl Zent

[Signed] Carl Zent (Well Driller) Kim Hansen

C51
License No. 223 02 1155 Date July 22, 19 75

(USE ADDITIONAL SHEETS IF NECESSARY)

S. F. No. 7356—OS—(Rev. 4-71).

State of Washington
Department of Ecology

SEP 30 1982

P. W. T.

ENVIRONMENTAL LABORATORY DATA SUMMARY METALS

ORIGINAL TO: LAB FILES
COPIES TO:
M. McCall
JON NEEL

SOURCE PACIFIC WOOD TREATERS PROGRAM NUMBER 040-1-560

DATE COLLECTED 4-13-82 RECEIVED 4-14-82 COLLECTED BY JON NEEL

Sample (Log) Number	Units	Standard Deviation ± %	82-1719		82-1720		82-1721		Primary DW. Std.	Secondary DW Std	Max. EP Tox.
Station:			82-4-608	Fly Ash & Bag Dust	82-4-609	Additional Ash	82-4-610	Bottom Ash	µg/l	µg/l	mg/l
Cu - TOTAL	mg/kg	10	19.5		1.6		1.85				
									100		
Zn - TOTAL	mg/kg	10	190		1.3		0.97				
										500	
Ag - TOTAL	mg/kg	10	<0.04		<0.04		<0.04				
- EP	mg/L	10	<0.04		<0.04		<0.04		50		5
Ni - TOTAL	mg/kg	10	0.55		0.30		0.22				
Cr - TOTAL	mg/kg	10	0.54		0.20		0.78				
- EP	mg/L	10	0.50		0.03		0.02		50		5
Cd - TOTAL	mg/kg	10	15.5		2.0		1.0				
- EP	mg/L	10	0.44		0.03		0.02		10		1
Pb - TOTAL	mg/kg	10	6.50		0.65		0.25				
- EP	mg/L	10	0.48		0.08		0.12		50		5
Ba - TOTAL	mg/kg	10	150		530		560				
- EP	mg/L	10	1.0		2.8		3.3				100
Be - TOTAL			N.D.		N.D		N.D				
				N.D. = NOT DETERMINED							

As — ?
Hg — 0
Se —

NOTE: Dissolved Metals: Those that will pass through a 0.45 µ membrane filter
Suspended Metals: Those retained by a 0.45 µ membrane filter
Total Metals: Those found in the unfiltered, rigorously acid digested sample
mg/L = ppm = µg/ml
µg/L = ppb = ng/ml
mg/kg = ppm - µg/gm
µg/kg = ppb = ng/gm
"<" is "less than" and ">" is "greater than"

ECY 040-2-82 (a)

1/ SUMMARIZED BY [illegible] DATE 7/20/83

Washington Department of Ecology

ENVIRONMENTAL LABORATORY
DATA SUMMARY
METALS

ORIGINAL TO: LAB FILES
COPIES TO: Jon N661

RECEIVED
SEP 30 1982
P.W.T.

SOURCE Pacific Wood Treaters, Ridgefield PROGRAM NUMBER

DATE COLLECTED 4-13-82 RECEIVED ____ COLLECTED BY J. N661

Sample (Log) Number	Units	Standard Deviation ± %	1719		1720		1721		Primary D.W. Std		Max EP Tox
Station:			Fly Ash South Baghouse		Multiclone Ash		Bottom Ash		µg/l		mg/l
Hg, Total	mg/kg		<0.1		<0.1		<0.1				
									2		.2
As, Total	µg/kg		600		85		55				
EP	µg/l		72.		2.3		0.5		50		5
Se, Total	mg/kg		14		10		9				
EP	µg/l		0.49		0.13		0.005		10		1
Ba											
Ag											
Na											
K											
Ca											
		Note:	The above information reported by Teledyne Isotopes from the DOE Redmond Laboratory								

NOTE: Dissolved Metals: Those that will pass through a 0.45 µ membrane filter
Suspended Metals: Those retained by a 0.45 µ membrane filter
Total Metals: Those found in the unfiltered, rigorously acid digested sample
mg/L = ppm = µg/ml
mg/kg = ppm = µg/gm
µg/L = ppb = ng/ml
µg/kg = ppb = ng/gm

"<" is "less than" and ">" is "greater than"

SUMMARIZED BY G. Freeman DATE 8-31-82

REVIEWED BY ____ DATE ____

ECY 040-2-32 (c)
Rev. 8/31

SIGNED WELL ACCESS AGREEMENTS

DRAFT

CLOSURE PLAN
FOR
RIDGEFIELD BRICK AND TILE SITE
RIDGEFIELD, WASHINGTON

EXCERPTS - GROUND WATER MONITORING

JULY 15, 1983

SUBMITTED TO:

PACIFIC WOOD TREATING CORPORATION
110 WEST DIVISION STREET
RIDGEFIELD, WA 98642

SUBMITTED BY:

SWEET, EDWARDS & ASSOCIATES, INC.
P.O. BOX 328
KELSO, WA 98626

IN ASSOCIATION WITH

PATRICK H. WICKS, P.E.
2535 - 152ND AVENUE, N.E.
REDMOND, WA 98052

During the first six months of the post-closure period, inspections for Items A through G will be performed twice monthly. During the second six months of the post-closure period, Items A through G will be inpsected once per month and thereafter once per quarter. Items H and I will be inspected once per quarter throughout the post-closure period.

MAINTENANCE

Any deficiencies noted during inspection shall be reported to the Plant Manager and appropriate corrective action taken to maintain the effectiveness of the top seal, minimize ponding on the site, minimize disturbance of the site and generally retain its security.

GROUND WATER MONITORING, SAMPLING AND ANALYSIS

Sample collection, at the lysimeters installed under the closure plan, will involve measuring the depth to water if perched water is available or placing a vacuum on the lysimeter. Samples will be pumped from the lysimeter with a peristaltic pump where lift allows this practice. Pressure evacuation of the lysimeter will be used where pumping lift limitations dictate. Simple pumping from an access port in the toe drain included for Option III will provide for samples. Field measurements of temperature, electrical conductivity and/or pH will be conducted when possible. Field filtering of turbid samples will be completed when necessary, with or without split samples as directed by the DOE.

Sampling of the background and two downgradient wells will be facilitated through 10 minutes of pumping to waste followed by sample collection at the hydrant nearest the well head. Although we recognize this does not comply with the strictest Quality Assurance/Quality Control program for inorganic/organic testing of aquifers, it will provide a measure of the quality of water being delivered for domestic use. This collection procedure minimizes any complicated clean up procedures during sampling. Signed agreements with each of the three well owners for sampling access are appended.

FROM PAGE 10 OF ADDENDUM

3b. One pore volume from the lysimeters or sampling port will be pumped to waste. Then, during sampling of the toe drain and the lysimeters, a system as shown on the attached Figure 14 will be employed. The dedicated tubing from the lysimeter or toe drain port will be attached to an Erlenmeyer flask. Pumping through a second tube from the flask or by pressure introduction into a second dedicated tube through the lysimeter will force the sample into the flask. If the sample is not turbid, it will then be transferred directly to the laboratory bottles. If it is found that the sample is turbid, it will be field filtered using a 0.45 micron filter as it is transferred to the laboratory bottle.

Cleanup between sites will include a detergent-distilled water-methyl alcohol-distilled water sequence of rinses for the Erlenmeyer flask.

As suggested in the draft ~~closure~~ plan, a chain of custody form will be completed and the samples preserved and transported as per the references shown under six (6) below. (SEE PAGE 35)

~~Samples will be collected in containers supplied by a State Certified Laboratory with appropriate preserving agent(s) as prescribed in Standard Methods for the Analysis of Wastewater (1979), Methods for Chemical Analysis of Water and Wastes (1979), and/or other regulatory direction. Transport in ice chests and laboratory testing as per above references will be conducted. Chain of custody control will be assured through use of the form shown on Figure 13.~~

6. On page 35, reword the first paragraph as follows:

* Samples will be collected, preserved, transported and analyzed in accordance with Handbook for Sampling and Sample Preservation of Water and Wastewater (1982), Methods for Chemical Analysis of Water and Wastes (1979) and Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater (1982), and/or other regulatory direction. Chain of custody control will be assured through use of the form shown on Figure 13. Analysis will be performed at a commercial laboratory or at Pacific Wood Treating Corporation's laboratory, dependent on adequate experience and capabilities to properly analyze for the constituents noted below.

If PWT's laboratory is used, every tenth sample will be split for duplicate testing by D.O.E. and/or a commercial lab.

*SEE REFERENCES, PAGE 40

4. On page 35, in column 1), delete "Floride" and "Coliform bacteria".

On page 35, in column 2), delete "Manganese", "Sodium" and "Sulfate", and add "Copper", "Pentachlorophenol" and "Napthalene".

During the first year following completion of the closeout, there will be quarterly sampling of the following constituents: (3 CONSTITUENT GROUPS)

1) Primary Drinking Water Standards:

Arsenic ✓

Barium ✓

Cadmium ✓

Chromium ✓

~~Fluoride~~

Lead ✓

Mercury ✓

~~Nitrate~~

Selenium ✓

Silver ✓

~~Coliform bacteria~~

(Note: Pesticides, etc. not considered necessary for this waste type.)

2) General Ground Water Quality:

~~Chloride~~

~~Iron~~

~~Manganese~~

Phenols

~~Sodium~~

~~Sulfate~~

COPPER ✓

PENTACHLOROPHENOL ✓

NAPTHALENE ✓

SEE NEW PAGE DE83-468

NOTE: SEE PAGE 37 FOR 3RD GROUP OF CONSTITUENTS

3) Ground Water Contamination:

pH

Specific Conductance

~~Total Organic carbon~~

~~Total Organic Halogen~~

NOT NECESSARY PER ERIC EGBERS, VERBAL TO RANDY SWEET, 4-3-84.

(Note: ~~Four replicate samples to be collected for each sample for first year.)~~

On page 37 in column 1) reword note as follows:

Note: Quarterly duplicate or split samples will be collected where volumes allow from background and ~~two~~ THREE downgradient wells as well as the toe drain and three lysimeters. Single samples will be tested and the split held for backup verification, should significant contamination be observed.

?

5. As discussed in the meeting, all sampling lines from the lysimeters as well as the toe drain port, will be dedicated.

On page 37, at the end of the GROUND WATER MONITORING, SAMPLING AND ANALYSIS section which begins on page 34, add the following:

The toe drain (distribution box, Option III) will be sampled and analyzed on the same schedule and for the same parameters as the lysimeters and wells. If the results of analysis of water from the toe drain exceeds the concentrations below, a 500-gallon or larger holding tank will be installed to collect water by gravity drainage from the toe drain. These concentrations are: 0.05 mg/l arsenic (Primary Drinking Water Standard), 0.055 mg/l pentachlorophenol and 2.3 mg/l napthalene (Acute Freshwater Fish Toxicity). Collected water, if above these concentrations, will be disposed in accordance with State/Federal

regulations, possibly at Pacific Wood Treating Corporation's plant. Below these concentrations, this water will be allowed to drain to the ditch shown on Figure 10.

Note: The above item has been added to the post-closure plan, rather than the closure plan as suggested by the August 4 letter.

1. On page 37, add a new section, "POST-CLOSURE PERIOD", to read as follows:

This plan shall be carried out over a period of thirty (30) years beginning at completion of closure, unless a reduction of that period is approved by the U.S. Environmental Protection Agency and Washington Department of Ecology.

During the first year of sampling and testing, reports in compliance with 40 CFR 265.93 and .94 will notify the regulatory agencies of results and identify monitors which exceed maximum Primary Drinking Water Standards. This will be done quarterly for the first year and annually or as necessary for compliance in the following years.

DESIGNATED CONTACT

The Plant Manager of Pacific Wood Treating Corporation, 111 West Division Street, Ridgefield, Washington 98642, (206) 887-3562, is the designated company contact under this plan. An updated copy of this plan will be kept at the office of the Plant Manager during the post-closure care period.

~~Any modifications to this plan will be submitted to the U.S. Environmental Protection Agency and Washington Department of Ecology in accordance with 40 CFR 265.118 (c) and (f).~~

On page 37, reword "MODIFICATIONS" section to read as follows: Any modifications to the post-closure period, monitoring or any other provisions of this plan will be submitted to the U.S. Environmental Protection Agency and Washington Department of Ecology in accordance with 40 CFR 265.118 (e) and (f).

REFERENCES

FENN, Dennis G., Keith J. Hanley, and Truett V. DeGeare, 1975, Use of the Water Balance Method For Predicting Leachate Generation From Solid Waste Disposal Sites: U.S. Environmental Protection Agency EPA/530/SW-168, p. 40.

HUGHES, G. M., R. A. Landon, and R. N. Farvolden, 1971, Hydrogeology of Solid Waste Disposal Sites in Northeastern Illinois: Illinois State Geology Survey under E.P.A. demonstration grant G06-EC-00006, p. 154.

Standard Methods for the Examination of Water and Wastewater, 13th edition, 1970, American Public Health Association.

THORNTHWAITE, C. W., and J. R. Mather, 1957, Instructions and Tables for Computing Potential Evapotranspiration and the Water Balance: Drexel Inst. of Tech., Lab of Climatology, Pub. in Climatology, v. X, No. 3.

U. S. Environmental Protection Agency, 1979, Methods for Chemical Analysis of Water and Wastes: EPA-600/4-79-020.

On page 40, delete the third reference and add the following two references:

Handbook for Sampling and Sample Preservation of Water and Wastewater: EPA-600/4-82-029, September 1982.

Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater: EPA-600/4-82-057, July 1982.

AUGUST 18, 1983

PACIFIC WOOD TREATING CORPORATION IS HEREBY GRANTED PERMISSION TO SAMPLE MY WELL AT (b) (6), RIDGEFIELD, WASHINGTON.

SUCH SAMPLING TO BE ON AN INTERMITTENT BASIS AT NO COST TO ME. COPIES OF TEST RESULTS ARE TO BE FURNISHED TO ME AT NO COST.

DURATION OF THIS AGREEMENT IS FOR THIRTY YEARS OR LESS.

SIGNED Elmer C Muffett ELMER C. MUFFETT
OWNER